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[*Authors alone are responsible for the contents of their respective Papers.*]

SECRETARY'S NOTES.

1. The following officers became members of the Institution during the month of July :—

Second Lieutenant R. H. F. Gladwin, Scots Guards.
Second Lieutenant D. R. Drummond, Scots Guards.
Second Lieutenant W. D. Clark, Coldstream Guards.
Second Lieutenant D. D. Haskard, R.G.A.
Major C. E. Corkran, Grenadier Guards.
Captain F. V. L. Pritchard, Indian Army.
Second Lieutenant E. W. S. Balfour, R.F.A.

(No officers of the Royal Navy or Auxiliary Forces joined the Institution during the month.)

2. The Council desire to intimate that the office hours for the members of the staff are from 11 a.m. to 5 p.m., except on Saturdays, when they are from 11 a.m. to 2 p.m. One official is, however, always on duty while the Museum is open.

3. The following additions have been made during the month to the collection of belt plates, etc., in the Museum :

Officer's shoulder belt plate, 7th Royal Fusiliers; given by Colonel R. W. Sparkes.

Officer's belt buckle, 43rd Monmouthshire Light Infantry; given by Lieut.-Colonel A. Longley.

Officer's shoulder belt plate, 20th Regiment; given by Colonel G. S. Maxwell.

It is hoped that officers in possession of specimens of belt plates, etc., not already in the Museum, will kindly present them to make the collection complete.

4. Major-General H. D. Hutchinson, C.S.I., Director of Staff Duties, has been appointed a member of the Council, vice Major-General M. Protheroe, C.B., C.S.I., deceased.

5. Colonel Lord Raglan has kindly contributed to the Museum the Full-Dress Coatee of the Master-General of the Ordnance, worn by Field-Marshal Lord Raglan when holding that office in 1852.

6. The building will be closed for cleaning purposes from August 14th to August 31st inclusive. The Museum will be open as usual.

7. When applying for catalogues of the Nelson Exhibition, members are requested to forward one shilling, the cost of the book, with the application.

8. The Institution of Naval Architects held a conversazione in the Museum on the evening of July 20th. The band of the Royal Artillery played a selection of music in the gallery. The conversazione was preceded by a lecture in the Theatre by Captain R. H. S. Bacon, D.S.O., R.N., on Submarines.

9. Officers desirous of becoming members of the Institution are reminded that those joining after October 1st will not be charged the following year's subscription.

MODERN MILITARY RIFLES.

By Major the Hon. T. F. FREMANTLE, 1st Bucks V.R.C.

Tuesday, 28th March, 1905.

Major-General Sir THOMAS FRASER, K.C.B., C.M.G., late R.E., in the Chair.

THE subject which I have undertaken is a very large one, and one not to be exhausted within the limits of a paper. It offers endless points, both of detail and of principle, to be considered. Its aspects are many and various: historical, theoretical, practical. There is primarily the point of view of the infantryman and the cavalryman; there is also that of the engineer, the chemist, the sportsman, and the expert marksman. And it has to be remembered that the outcome in concrete form of all these views is necessarily a compromise upon which, from one or other point of view, it is almost certain that improvement will be possible.

LENGTH OF RIFLE.

Let us take first the dimensions of the rifle. It must be noted that the interposition of a breech action between the small of the butt and the barrel tended to reduce the length of barrel of the breech-loader, as compared with the muzzle-loader. Similarly, the adoption of the box magazine and the bolt action still further curtailed the barrel. A similar change took place in the weapons of all nations.

The first breech-loading rifle of the British Army was the Snider. This had a length of 4 feet 7 inches, and, with its bayonet fixed, measured half an inch over 6 feet. The Martini-Henry, though $5\frac{1}{2}$ inches shorter than the Snider, had a long bayonet, so that it was only 1 inch shorter (5 feet $11\frac{1}{2}$ inches) with the bayonet attached. The ·303, of the same length as the Martini-Henry (4 feet $1\frac{1}{2}$ inches), with the bayonet fixed was actually 10 inches shorter (5 feet $1\frac{1}{2}$ inches). The length of rifle and bayonet is a subject on which I hope to touch later.

The L.-E. short rifle, with butt of normal (*i.e.*, medium) length, measures 3 feet 8 inches without, and 4 feet $8\frac{3}{4}$ inches with its bayonet. It is a curious fact that reduced length and weight should be more important to the mounted man, whose horse carries both himself and his weapons, than to the foot soldier. Opinion is much divided as to the best means of attaching the rifle on horseback. The solution of this problem may well have a bearing on the proportions of the rifle to be carried.

Ingenious attempts have been made to combine a 30-inch barrel with a reduction in the length of the whole rifle, by Mr. Thornycroft and Major Godsal. This is effected by altering the action so that it and the bolt are set back and the length of butt behind them reduced, and it entails certain modifications to meet the necessary curvature of the stock. These rifles are necessarily still in the experimental stage.

Weight.

The more elaborate breech and magazine mechanism tended to an increase rather than to a reduction of weight. Owing to the weight and clumsiness of the long rifle on horseback, we, in common with other nations, armed our mounted troops with a carbine, weighing nearly 2 lbs. less than the rifle, and 9½ inches shorter. The failure of the carbine in a recent war, in which there was much work at long ranges, is a matter of history. Handiness and lightness go together in the main, though the question of the balance of the weapon is an important one. The weight of the bolt action has tended to throw back the centre of gravity of modern rifles, as compared with older patterns, making them, on the whole, handier. As regards weight, it is obviously undesirable that the soldier should carry a heavier arm than is necessary. Weight saved in the arm can be added to the ammunition carried. In addition to this, the strain on the soldier seems to be heavier than formerly. We read of battles continued day after day, and of the fighting man's power of physical and nervous endurance being taxed up to or even beyond its limit. Whether in such fighting or on prolonged marches every ounce of weight must be a consideration.

What, then, are the factors limiting the lightness of a military rifle? First, that it should be amply strong enough to stand rough usage of all kinds, as well as the strain of bayonet fighting. The long fore end, band, and nose-cap add much to the weight of the arm as compared with a rifle of similar power made for the sportsman. The Boers in many cases cut away the greater part of the fore end of their Mausers, not needing to use the bayonet.

The second factor tending to keep up the weight of military arms is the recoil. This is more important than formerly, because in modern war a very large number of shots may have to be fired in a day. The velocity of recoil and the energy which has to be absorbed by the shoulder are reckoned to be for various British rifles as follows:—

—	Weight.	Velocity of recoil.	Energy of recoil.
	lbs. ozs.	Feet per second.	Ft.-lbs.
Snider	9 1	12·05	20·42
Martini-Henry	9 0	13·85	26·81
Lee-Enfield	9 4	9·19	11·9
L.-E. Short Rifle ...	8 2½	10·37	13·4

The energy of recoil of an ordinary shot-gun of 7 lbs. weight is about 24 ft.-lbs.; that of the U.S.A. short rifle is 18·33 ft.-lbs.

The increased energy of recoil of the L.-E. short rifle is, then, about 12 per cent. more than that of the Lee-Enfield, and it is just about half that of the Martini-Henry.

Energy of recoil is not synonymous with the blow felt by the shoulder, but with rifles of similar type it will serve as something of a general guide. It is not the least of the virtues of the modern small-calibre rifles that their kick is insignificant in comparison with that of such rifles as the Martini-Henry.

The weights of modern infantry rifles are as follows:—

	lbs.	oz.
Portugal	10	3
Switzerland	9	13
Denmark	9	11¾
Holland	9	11
Spain	9	6¾
Great Britain (L.-E.)	9	4
France	9	3½
Turkey, United States, 1898	9	1
Germany	9	0
Russia	8	15½
Roumania	8	13
Japan, Belgium	8	9½
Italy	8	6½
Austria	8	5½
Great Britain (L.-E. short rifle)	8	2½

The new short rifle of the United States weighs 8 lbs. 15 oz.; it is therefore only 2 oz. lighter than the Krag-Jorgensen rifle, pattern 1898, which it is designed to supersede. It is understood that the manufacture of this short rifle is not being proceeded with, pending further trials against a modified long rifle. Switzerland has a short rifle weighing 8 lbs. ½ oz., with which certain special troops are armed for work in the mountains. It is only sighted to 1,200 yards, and occupies a position midway between rifles and carbines.

Actions.

Bolt actions, now universal for military rifles, are rapid in working, simple, and safe, though it took many years to make them so. There is in nearly all of them a strong family likeness. The more solid the forward part of the bolt and the further forward the lugs which take the strain of the explosion, the stronger will be the action. The action of our Service rifle has the lugs so far back as to put under strain a considerable length of the bolt and the body, and it is much less strong than most modern actions. Nevertheless, it has accomplished much useful work in war. The actions of the Danish and United States (1898 pattern) Krag-Jorgensen rifles have only a single resisting lug. A weak action necessarily limits the pressures which can be permitted, and so limits the power of the cartridge. The action of the ·303 is perfectly capable of withstanding a pressure of more than 20 tons to the inch; but for military purposes it is necessary to allow a considerable margin in case of an accidental rise of pressure. Consequently, the working pressure is usually kept some 20 or 25 per cent. within the limit of safety. Figures stating pressure must be taken with reserve, but it would seem that our own rifle shares with those of Portugal (1886) and Denmark (1889) the distinction of having pres-

sures less than 16 tons. The working pressure for our long rifle is $15\frac{1}{4}$, and for the short rifle $15\frac{3}{4}$ tons. Other nations are credited with much higher pressures: Turkey, Austria, and Belgium, with over $19\frac{1}{2}$ tons; Germany, with 21; and Spain, with $22\frac{1}{4}$, according to the Official Text Book of Small Arms, 1904. The last figure is no doubt much exaggerated; but actions can be made to stand such pressures safely. The new U.S.A. short rifle is designed for a normal pressure of 20 tons, and its bolt has 3 lugs right forward instead of the 2 which are provided in nearly all actions. This action was tested with cartridges loaded to give 29 tons, which it stood perfectly. With one designed to give 45 tons the cartridge case and the extractor were broken, and the chamber slightly bulged, but the bolt held well. There is thus no difficulty, from the point of view of the strength of a well designed action, in making use of working pressures fully 25 per cent. higher than those of our Service cartridge.

If the lugs of the bolt do not bear equally upon the shoulders taking the resistance, a twist is given to the action under the strain of the explosion, and the direction in which the bullet is discharged will be affected. Special care therefore must be given to the fitting of the lugs. The single lug of the Krag action, already alluded to, must necessarily set up undesirable vibrations on firing.

Straight Pull Actions.—There is no difficulty in designing actions in which by a direct backward movement of the bolt, the lugs are first unlocked, and then the whole bolt drawn backwards. Austria has such a bolt in her rifle of 1895, and Switzerland another, dating from 1889. The Lee action adopted in 1898 for the United States Navy rifle (a pattern very shortly afterwards discarded) worked backwards and forwards without turning, though it was neither a straight pull nor a bolt action. The Ross rifle, recently adopted by Canada, has a straight pull. But it is evident that the greater simplicity of the turning bolt, and the ease with which it can be made to give a powerful primary extraction, are generally thought to be points of high importance. The chief recommendation of the straight pull action is its greater rapidity. But it is known to anyone who is in the habit of handling magazine rifles, that the two motions of the ordinary bolt—the forward motion to close, and the turning motion to lock—are combined by the practised hand into one motion, taking only infinitesimally longer than the single straight motion. This loss of time is so small as to be almost immaterial when compared with the time occupied in aligning the rifle, even in rapid fire. Straight pull actions are easier to reload without taking the rifle down from the shoulder than those with turning bolts, while the sleeve helps to protect the bolt from dirt. But the general practice of nations is not in favour of the straight-pull bolt.

The Cut-Off.—The balance of practice is very decidedly against the addition of a cut-off to the rifle, Denmark, France, Portugal, Turkey, and the United States alone having it. The British Navy still think it desirable. The explanation of its unpopularity probably lies in the objection to having to teach two methods of loading, one through the magazine, and the other directly into the chamber.

The Safety Bolt.—This is in general use, the exceptions being the rifles of Denmark, France, and Portugal, all comparatively old patterns. The Lee-Metford had no safety bolt; but one was adopted

for the Lee-Enfield. The safety bolt of the L.-E. short rifle is a reversion to an earlier pattern, and is lighter and more compact. It is actuated by the thumb, and lies on the left-hand side of the bolt, being pivoted on the aperture sight axis.

The Trigger Pull. — In the L.-E. short rifle, the double or draw pull, universally in use in Continental rifles, has been adopted. It has decided advantages, though it feels awkward to fingers accustomed to the ordinary pull-off. It enables a safe margin of weight to be combined with a comparatively delicate release, and it is one of the matters in which it would seem that we have been wise to adopt the Continental practice.

Magazines.

The tube magazine having been almost universally superseded by the box magazine, there are still various forms of the latter. The upright box magazine is either narrow and deep, suitable for the single column of cartridges inserted with their clip, or it is adapted for a double row of cartridges, lying alternately right and left, as in our own rifle. Such a magazine is suitable for charger loading. In the Mondragon rifle of 5-mm. bore, a clip is used containing the cartridges in a double column, but this system is still in the experimental stage.

Another class of box magazine is that which has its platform and spring controlled by a lever in the fore-end, so that the magazine can be filled with loose cartridges as required, the pressure of the spring being relieved, and the cartridges poured into it or put in singly.

An analogous magazine is the horizontal box of the Krag-Jorgensen rifles, in which the cartridges are inserted, either singly or several at a time, through a trap door in the side of the rifle under the bolt. When the trap door is opened, the magazine spring is put out of action; when it is closed, the cartridges are pressed upwards, so as to engage with the bolt when drawn back.

Another variety of magazine is that in which the cartridges are stripped from the charger into a revolving receptacle, as in the Mannlicher-Schoenauer. This is an extremely neat magazine of recent introduction, and has not been adopted by any Power.

It follows from what has been said that magazines for a charger system are more compact, in proportion to the number of cartridges which they hold, than those containing clips. The Lee-Enfield magazine contains 10 cartridges, and the use in connection with it of a charger holding 5 seems an admirable arrangement. The magazine of the Swiss rifle holds 12 cartridges, and the charger used with it holds 6. The clip of the Italian rifle also holds 6 cartridges, but otherwise 5 is the rule for all nations. The larger the number, the greater is the risk of jamming.

The balance of modern opinion inclines towards chargers rather than clips, and this in part for the reason that a clip-magazine must have an opening in the bottom, to allow the clip to fall out, and is therefore liable to the intrusion of dirt, etc.

Clips or chargers necessarily form an addition to the weight as well as the bulk of the ammunition to be carried. The addition to the weight varies from 7 to 14 per cent.; that of the British chargers is 9·3 per cent.

The various systems which have been invented for carrying the cartridges in bunches of 5 or otherwise, not connected together, and dropping them into the magazine by hand as required, have, so far, not met with much favour. The general opinion evidently is, that clips or chargers are well worth the additional weight which they entail. When a packet is handled, there is certainly less liability to spill or to fumble in loading, than in dealing with a handful of loose cartridges. When we consider the great waste of ammunition in the war in South Africa, due to cartridges spilt or left on the ground, it is evident that the prevention or diminution of such waste must add directly to the efficiency of an army. Such matters as the pattern of bandoliers or pouches, things outside the scope of the present lecture, are of the greatest importance.

Ammunition.

Light weight and small bulk are in some respects the most important qualities of small arm cartridges. The number of rounds which can be packed in a given space is of great importance in considering ammunition supply. The necessity of packing the cartridges so that they can be put straight into the magazine without rearrangement, has necessarily made obsolete the old system of laying them head and tail, compact as that was. Cartridges having rims take up more room in packing and in a magazine than rimless ones. In addition to this they are more liable to jam in feeding into the chambers, as, if the rim of the top cartridge is behind that of the next cartridge underneath it, it is not free to move forward.

It has been objected to rimless cartridges, that they have nothing but the taper at the neck to prevent their being forced too far forward into the chamber. They are, however, held by the extractor hook, and they do not seem in practice to cause any difficulty. The Japanese have adopted a cartridge case, grooved for the extractor, having also a very narrow rounded rim projecting enough to give a bearing in the chamber, but not enough to prevent one cartridge sliding over another in feeding up into the magazine. This compromise, though it is not a new invention, seems to offer a practical solution of the difficulty, and we may expect that the system of using cartridges with a large rim will gradually fall into disuse.

Propellant.—We need not linger over the explosive. Cordite has survived much criticism, and justified itself as a stable, efficient, and very controllable propellant, trustworthy in all climates of the British Empire. Its chief drawback, excessive erosion, may be diminished if the modified cordite, containing only 30 per cent. of nitro-glycerine instead of 58 per cent., can be made available for the rifle as it has already been for larger ordnance.

Velocity.

We may here pass for a moment to the subject of velocity. The advantages of imparting a high velocity to the rifle bullet need hardly be insisted upon. It has been said, and not untruly, that the ideal bullet should travel for 3,000 yards in a straight line and then drop to the ground. The nearer we can approach to this impossible ideal, the more efficient will our weapon be. Penetration and force of blow are of course important. Formerly a tree of ordinary thickness gave

good shelter against rifle bullets; now it would afford no sufficient protection.

But it is not penetration that is the chief justification of high velocity. The one abiding difficulty of the effective use of projectiles in war is that of adjusting the aim to the distance of the mark. So long as range finding remains what it is now, little more than a matter of guesswork, the importance of a flat trajectory will remain enormous, for it diminishes the necessity of accurate guessing.

The German Army in 1870 used the needle gun, giving a velocity of only 1,000 feet per second. In 1880 the highest velocity of military bullets was 1,500 feet, while of modern rifles none give velocities materially below 2,000 f.s., and some — those of Holland, Italy, Roumania, and Japan—attain or approach to 2,400 f.s. What, then, is the actual benefit to be obtained by such an increase of velocity?

Let us take the "dangerous zone" for an object 3 feet high at 1,000 yards. At this distance:—

With the	Enfield or Snider	the bullet took		11½	yards	to fall 3 feet.
„	Martini-Henry	„	„	16½	„	„
„	·303	„	„	26	„	„
„	·256	„	„	30	„	„

In other words, to hit a kneeling figure 3 feet high at 1,000 yards, the distance must be judged:—

With the	Enfield	to within 6	yards	one way	or the other.
„	Martini-Henry	8½	„	„	„
„	·303	13	„	„	„
„	·256	15	„	„	„

The difference here between the ·303 and the ·256 does not sound very much, but it is an addition of 15 per cent., and therefore very material. Similarly the rise and fall of the ·303 bullet does not exceed 3 feet for the first 460 yards, or so, of its flight; but that of the ·256 is within the same limit for about 25 yards further—a very material extension. We may consider that the Japanese rifle has rather more than this advantage over the Russian rifle. So far as can be judged from measurement of the sights of the new U.S. short rifle, the trajectory is slightly flatter than that of the ·256. The American bullet is rather more pointed, but its capacity for flight is very similar to that of the ·256. It is evident that, subject always to the necessary limitations, it is worth while to carry velocity as far as is practicable. It gives materially increased penetration—a matter of importance in some circumstances. The penetrative intensity of the ·256 bullet is at all ranges about 25 per cent. greater than that of the ·303. It therefore has in this respect a material advantage. On the other hand, it is rather more susceptible to the lateral influence of wind, but probably not enough so to be at any material disadvantage. The smaller diameter of the bullet may for practical purposes be taken not to affect the wounding power. High velocity is not inimical to accuracy, but rather favourable to it.

An increase of velocity in a rifle entails the passage through the bore of a larger flow of gases, presumably under an increased pressure. This means increased erosion of the barrel as well as increased wear from the bullet. A still more important factor limiting the increase of

velocity is the pressure. In adding to the charge in a cartridge, pressures are necessarily increased, and this can only be avoided by an increase in the capacity of the cartridge, to give a reduced gravimetric density. Such an enlargement of the cartridge has been made in the U.S.A. rifle, and in that case it is combined with an increase in pressure.

The Barrel.—There are other factors affecting velocity which are connected with the barrel.

1. The length of the barrel has an important bearing on the velocity, and, as already mentioned, it has tended to become shorter in the last five decades.

In the case of British Service rifles, the length has been reduced as under:—

	Length of barrel.
1853—Enfield (afterwards Snider)	39 inches
1871—Martini-Henry - - -	33·2 ,,
1889—Lee-Metford - - - -	30·2 ,,
1902—Short Lee-Enfield - -	25·2 ,,

In the corresponding period the barrels of the German rifles have been shortened from 35·4 to 29·05 inches.

The older rifles were necessarily longer for bayonet work than the new. But a comparatively long barrel was also necessary for firing in 2 or more ranks in close order. The short rifle may be taken to mark the abandonment of close-order firing in more than one rank.

The additional velocity given by a longer barrel as against a shorter one is fully worth consideration. The trials of the experimental short rifle of the U.S.A. gave a reduction of 87 f.s. for the reduction of 6 inches in length (30 inches to 24 inches), and the charge was consequently added to so as to increase the velocity of the short barrel by that amount, from 2,173 f.s. to 2,260 f.s. at 53 feet from muzzle.

It is one of the advantages of modern propellants that a high velocity can be imparted by them in a barrel of short length in a way which was impossible with black powder.

2. The velocity is also affected by the amount of friction and leakage of gas as the bullet passes from the cartridge into the barrel. Here construction of the "lead" or cone connecting the chamber with the rifling is an important element, and its shortening in the L.-E. short rifle is entirely to the good.

3. A third factor is the degree of friction in the bore and grooving, due to the construction of the barrel. The deepening of the grooves towards the muzzle in the short rifle appears to be quite a new departure. It is not clear what is the degree of increased velocity attributable to this cause. The increased depth of grooving brings some danger of an escape of gas past the bullet, which is undesirable.

Calibre.—The reduction of calibre which took place generally in military arms about 20 years ago was a startling development, received at first with hesitation, but made a success by the invention of practicable smokeless explosives. It was only by the reduction of the calibre that it was possible to achieve the reduction in the size and weight of the ammunition necessary to make the box magazine available as an addition to the rifle, and to enable the soldier to carry a much increased number of rounds. The whole cartridge of a modern military rifle is over 50 per cent. lighter than the M.-H. cart-

ridge, and does not weigh so much as the bullet fired by that rifle. The bulk of foreign Powers have, like ourselves, adopted calibres of 7½ to 8 mm., or about ·300 to ·315 inch.

The opinion of nations is at the present time divided as to the advantage of a further reduction of calibre. Italy 14 years ago adopted the 6½-mm. (·256) rifle of Mannlicher type, and this lead has been followed by Roumania (1893), Holland (1895), and by that very practical people the Japanese in 1900. Meanwhile Spain has an intermediate calibre, the ·276 (7-mm.) Mauser, familiar to many here as similar to the arm of the Boers. The U.S.A. having in 1898 boldly adopted the very small calibre of ·236 (6-mm.) for the arm of their Navy, shortly afterwards abandoned it, and have now altered the form of their cartridge, so as to get a higher velocity, but have retained their calibre of ·300. Germany modified the pattern of her Mauser rifle in 1898, but did not change the cartridge, and Switzerland did the same in 1900. Mexico is said to have adopted the Mondragon rifle of 5-mm. (·196-inch), and with a rifle of similar calibre produced experimentally in Switzerland by Colonel Rubin, he has obtained high velocities; but so small a calibre does not at present appear to be practical. For if the pressures are to be kept within reasonable limits, the cartridge must be enlarged to an awkward shape, while the barrel necessarily suffers more from the action of the gases and of the bullet upon it. Undue reduction of the calibre involves a loss of wounding power at very long ranges, and increases deflection of the bullet by the wind.

There is much more to be said for the calibre of 6½-mm. (·256). It gives a velocity of 2,400 f.s. without immoderate pressures. To compare it with the rifles of ·300 to ·315 calibre, it may be said that its bullet is as well proportioned (if not better) for flight, and that it is not deficient in wounding power. The present war should give more information on this point. It certainly makes an admirable weapon for soft-skinned game. Though its blow is less at extreme ranges, its higher velocity gives it an advantage in penetration and in flatness of trajectory—very important matters. On the other hand, the projectile is somewhat more affected by wind. The ammunition has, however, one definite advantage. The cartridge weighs from 330 to 350 grains, or 15 per cent. less than our cartridge. It weighs 22 per cent. less than the new U.S. cartridge of ·300 bore, which gives the same velocity; and it is decidedly less bulky. It is interesting that this smaller calibre should now be undergoing the test of war. The chief doubtful point about it is the increased wear and erosion in so small a calibre. On this, Japanese experience should now be able to throw some light. Cordite as now used in our rifles is perhaps too erosive a propellant for a ·256 rifle; but the Italians use ballistite, which is of much the same character.

Accuracy.

This is the quality which distinguishes rifles as a class from their smooth-bore predecessors, and a well-designed modern military rifle almost as much from the earlier rifles. Accuracy is a very necessary quality if the fighting man is to have confidence in his arm. Manufacture at the present time is so exact, and the limits of variation between individual rifles made in quantity are so narrow, that accuracy

or inaccuracy is far more a question of design than of make. It should not be necessary to labour the point that rifles should shoot as accurately as is possible within reasonable manufacturing limits. It is true that the bulk of firing in war must always be of the rough and ready kind. It is true, too, that only some men are capable of taking full advantage of the accuracy of the weapon; but these should not be unduly handicapped, for there are many occasions in war when accurate marksmanship goes for much. Nor can the necessary interest in getting the best work out of his weapon be aroused in the recruit, or maintained in the trained man, unless it is capable of responding to every demand that he may make upon it.

Barrel.—What are the chief causes of inaccuracy in rifles? As regards the design of the barrel, they should be few. There is a strong family likeness in the grooving and the spiral of modern rifles. It may be questioned whether the complications in manufacture introduced by tapering the depth of rifling, one way or the other, as was done formerly in the Martini-Henry, and recently in the L.-E. short rifle, are balanced by a sufficient real advantage. The same remark applies to the increasing spital or "gaining twist" which Italy alone of nations has thought it worth while to introduce into her Service rifle. The design of the barrel at the "lead" (already referred to) is also of importance as regards accuracy.

Bullet.—Any variation of friction in the barrel, as the bullet passes along it, tends to inaccuracy; consequently, the condition of the surface of the bore is of importance. The heavy pressure of metal upon metal, as the bullet is "swagged" into and through the bore, is apt to leave on the bore what is known as "metallic fouling." This deposit tends to rust as well as to inaccurate shooting. The material of the bullet envelope is therefore important. Opinion is, on the whole, divided between cupro-nickel (used for our Service bullet) and steel coated with cupro-nickel, to prevent rusting. The latter makes less metallic fouling, but perhaps wears the grooving more. Japan uses a copper-clad bullet, and Switzerland one of hardened lead, with a wrapping of paper to keep it from contact with the bore, the tip being sheathed with a thimble of steel, coated with cupro-nickel. Such a compound bullet cannot but make a much more smashing wound than the ordinary pattern of sheathed bullet. There is room for improvement in bullets in the direction of reducing the friction which takes place in the bore. A bullet without a cannelure gives somewhat more accuracy and decidedly greater penetration than one having a cannelure, as has been proved in recent experiments in this country and in America.

Pressures.—One of the factors in accuracy certainly is, that the pressure set up by the ignition of the charge should not be too low. It would seem that a low pressure allows an undue rush of gas round the bullet before it is fairly in the rifling. In this respect, there is some advantage in the use of a higher pressure than has been the rule with our Service ammunition. The pressure at the muzzle, on the contrary, should be low rather than high, for the most critical point in the course of a bullet is that at which it clears the bore and unseals the gases, which rush round it and tend to unsteady it. This increased muzzle pressure is one of the factors to be considered in designing a rifle with a shortened barrel.

The ·303 rifle, with a well-made barrel and a properly designed bullet, is capable of making quite as accurate shooting as the best of the Continental rifles. With ordinary Service ammunition, however, it is slightly inferior to the ·256 Mannlicher (Dutch pattern) and the ·276 Mauser (Mexican pattern). It would almost seem as if the L.-E. short rifle as produced in the ordinary run of manufacture is not up to the standard reached by it when in the experimental stage.

Sights.—Upon these depends the degree of accuracy which can be obtained from a rifle when the human element is introduced. Shooting from the fixed rest merely tests the accuracy of the barrel, and not that of the weapon in the soldier's hands.

The foresight in foreign rifles is almost universally of the barley-corn or coned shape familiar to us. It is the strongest form, but has the disadvantage that whether more or less of the sight is seen over the backsight, the proportions of it remain the same. In the United States rifle, the foresight is a thick blade with parallel sides. A strong foresight of bead shape (the form which is generally preferred for sporting purposes) was tried experimentally for the L.-E. short rifle, but the barley-corn was preferred. The addition of a handguard to the rifle necessitates the raising of the sights, so that the line of aim may not be interfered with. But in military rifles, such as the Lee-Enfield, which have an upward throw or jump, the foresight necessarily stands on something of a high block, in contrast to the very low block necessary in the Snider and Martini-Henry. Owing to the distortion of the barrel inseparable from brazing, and to the liability of solder to melt when the barrel is heated by firing, it is now usual to form the foresight and backsight blocks with rings beneath them, fitting the barrel, and pinned to it. In the L.-E. short rifle, the foresight is so made. The backsight has a curved bed fitting the barrel, and is fixed by screws.

In the same rifle a new departure has been taken in having a very complete and strong protection for the foresight permanently fixed to the rifle. Two strong side-pieces, made as part of the nosecap, rise on each side of the sight, and curve inwards above it. They are roughened so as not to catch the light, and effectually guard against damage from a fall or a blow.

Backsights are of two types. The first is that to which we have hitherto been accustomed on our military rifles, in which elevation for the first 400 or 500 yards is given by moving a slide along a ramp, and elevation for longer ranges by raising the flap to a vertical position, and adjusting the slide upon it. This type of backsight is used by a majority of nations. In most examples the slide is locked by means of a catch fitting into notches cut at intervals, as at each hundred paces or metres, and the sight cannot be adjusted for intermediate ranges. The backsights of the Belgian, French, and Russian rifles, as of our own Lee-Enfield and its predecessors, depend on springs for holding the slide in position; it can therefore be adjusted accurately wherever necessary. The slide on the Lee-Enfield backsight has the grave disadvantage that it is liable to become loose by wear, and to shake down with the shock of the discharge. If it fits tightly, it is difficult to adjust, especially with cold fingers.

The backsight approved for the new rifle is of the second type; that in which the sight is hinged, and in which its rising motion is

continuous until it is nearly upright, the same V being used at all distances. A spring catch engaging in notches holds the sight firm, at fixed intervals of yards or metres. To obtain an adjustment for intermediate distances, the L.-E. short rifle has the V carried on a small slide, moved by a vertical screw. A similar slide moved by a transverse screw enables allowance to be made for wind. The British rifle is the only military rifle having this refinement. A new arrangement was adopted some time since by the United States for the Krag-Jorgensen rifle, in which the backsight was pivoted and could be turned laterally through a small arc, and clamped in the desired position. This form of sight appears to have been abandoned in the United States short rifle, the backsight of which has no lateral motion.

Opinions differ as to the value of a lateral adjustment, but it may be said that, though it cannot be used for rough and ready work, it is of great advantage in any circumstances, whether in peace or war, in which really accurate shooting is desired. It has especially an advantage in the instruction of recruits, by enabling them to aim at their mark, even in a side wind. It is most discouraging to the learner to be expected to aim right away from his mark, perhaps even so far that he has to lose sight of it entirely, and it is not more difficult to teach the beginner to adjust his sights laterally for wind than vertically for elevation.

In aiming at extreme ranges, over the ordinary backsight, the neck has to be craned, or the butt brought very low on the shoulder. There is thus an advantage in having the line of aim lowered for the farthest distance. In the British, the Danish, and the older pattern of Austrian rifle, this is provided for by a method of sighting alongside the fore end and not over the barrel. Our own aperture backsight and dial-sight have proved themselves useful. The aperture sight has great advantages, as sportsmen know. The radius (or distance between foresight and backsight) of the long-range sights is only about 16 inches. The radius of ordinary sights is governed first by the length of the barrel (the foresight being placed as near the muzzle as is practicable), and secondly by the necessity for keeping the backsight far enough from the eye to obviate undue blur in aiming. The sight radius of the Lee-Enfield rifle is $21\frac{1}{2}$ inches (flap down) and $23\frac{1}{2}$ inches (flap up). That of the L.-E. short rifle is 19 inches. The U.S.A. short rifle, with a barrel 1 inch shorter than that of our short rifle, has a sight radius of 23 inches, 4 inches more. This is obtained by bringing the backsight as far to the rear as possible; instead of being 24 inches in front of the heel of the butt, it is only $19\frac{1}{2}$ inches from it. No nation has attempted to introduce telescopic sights upon rifles, useful as they would be in skilled hands on some occasions. It has been suggested by Lieut.-Colonel Mayne and others that rifles fitted with them might well be issued to certain picked marksmen in each company. But, so far, the practical difficulties have proved great. Their cost would be considerable, and they cannot but be liable to be damaged, or put out of adjustment. They have proved useful enough both in the backwoods and on the deer forest. But it is quite another matter to adapt them for adjustment in a large arc of elevation.

The following are the extreme distances to which the rifles of various countries are sighted, expressed in yards:—

United States (1898 Krag-Jorgensen)	1,800 yards.
Denmark - - - - - - -	2,078 ,,
Russia - - - - - - -	2,096 ,,
Austria, Bulgaria, Greece - -	2,132 ,,
Belgium, France, Germany, Holland, Italy, Japan, Roumania, Spain, Switzerland - - - -	2,187 ,,
Portugal - - - - - - -	2,406 ,,
Great Britain - - - - - -	2,800 ,,

In the Boer War, as is well known, our rifle was on occasion fired at distances up to its extreme limit of sighting.

The adjustment of the sighting of every rifle made is a very necessary improvement recently introduced into our factories of military arms.

Stock.

The French rifle and our own are the only two which have the stock completely divided by the action. The divided stock was introduced in the Lee-Metford partly in order not to waste the material for butts and fore-ends which had been at the time provided for the Martini-Henry. The stock bolt, securing the butt to the action, undoubtedly strengthens the stock at its weakest part—the small. On the other hand, there is a tendency for the bolt to become unscrewed under the strains it meets with, and under shrinkage of the wood. If this happen, as it may on active service, the butt becomes loose. The divided stock undoubtedly adds slightly to the weight of the arm; but in case of breakage, either part can be replaced separately.

The barrel groove in the fore-end of the L.-E. short rifle is enlarged so as only to touch the barrel at the reinforce, at the lower band, and near the muzzle. This much reduces the probability of the barrel having its shooting affected by the warping of the fore-end. A somewhat similar provision is made in the case of the Swiss rifle.

In the Lee-Enfield rifle the pull-through and oil bottle were carried in the butt, in the hole made for the stock bolt; this has been discontinued in the short rifle. Weight is thereby saved. The practice of carrying these cleaning materials in the stock has not commended itself to other nations.

In the short rifle the butts are made of 3 different lengths, to suit men of short and long arms. This is a reversion to a practice which prevailed with the Martini-Henry, the stock of which was made in 2 different lengths, and is based on a sound principle. Though a man may get used to a stock of almost any length, it is a great help in snap-shooting and quick work if the stock bears some kind of relation to the proportions of the individual. This is fully recognised by all sportsmen.

Handguard. — The Belgian Mauser and Danish Krag-Jorgensen have the barrel protected by a steel tube or casing, touching it only at the breech and muzzle. On this casing the sights are fixed. The German rifle (pattern 1888) had a similar casing, but it was abandoned in the 1898 pattern. Such a casing acts as a substitute for the hand-guard, and as a protection to the barrel. But to save weight the barrel has to be made thinner, and therefore weaker, while the casing

itself has hardly sufficient substance. It adds to the cost both of manufacture and repair, and rust is apt to be set up within it.

With magazine fire an ample handguard is necessary. The great heat developed by rapid fire makes it impossible to touch the barrel with the naked hand after a few shots. And it must be possible for bayonet fighting to catch hold of any part of the rifle. It is right therefore to sheath the barrel in wood for all, or nearly all, its length. Another advantage is gained by so doing. The heated air rising from the naked barrel when hot is apt to blur the vision in looking along the sights, and the wood casing avoids this drawback. The new U.S.A. short rifle, like our own, has its barrel completely cased; other nations content themselves with a handguard extending to the lower band.

The Bayonet.

With regard to the bayonet, the conditions have changed more than is commonly realised. It was, in the first place, a substitute for the pike. Cavalry could ride down any infantry not protected by a high and continuous spiked fence. Viewed in this light, the length of musket (or rifle) and bayonet must of necessity be sufficient to keep the mounted man and his horse at a safe distance.

The hammerless breechloader did much to enable the foot soldier to substitute bullet for bayonet in many circumstances. The magazine rifle has done much more, and that is why we find that a reduction of 10 inches in the length of the bayonet weapon was possible when the Martini-Henry was superseded by the ·303 rifle. This great reduction, from 5 feet 11½ inches to 5 feet 1½ inches, was found to be rather an advantage than otherwise in quick fencing work. The main use of the bayonet, in fact, is no longer as a defence against cavalry; it is for the final charge and hand-to-hand tussle, and for exceptional occasions at close quarters. The long reed-shaped bayonet of the Martini-Henry was ill proportioned; it was too long for its weight. The knife bayonet has the advantage of being available for many purposes in campaigning. Whether or not we can afford some further reduction in the length of the bayonet-weapon, if it can be made handier and quicker in use, is a question of fact, and one not difficult to decide by trial. Armies no longer come to "push of pike," and length is not everything in a weapon which exists mainly for use in a scrimmage. With the musket and rifle of large bore, the bayonet was fixed to the barrel, which was stiff enough to carry it with a small amount of support from the fore end. In modern rifles, the reduced diameter of the barrel makes a greater stiffening necessary. The attachment of the bayonet to the barrel affects (as is well known) the direction of the bullet, and in the new British rifle it has been thought well to attach the bayonet to the fore end and not to the barrel. This demands a heavier nosecap (7 oz.), but it saves the barrel from the risk of strain. The bayonet of the German Mauser is similarly attached to the fore end and not to the barrel.

We sometimes see an ancient blunderbuss fitted with a short bayonet, which lies under the stock, and on a catch being released springs round into the proper position for use. This has the advantage that the bayonet is inseparable from the weapon. The carbine with which the Italian troops are armed has a bayonet of triangular section, hinged to the nosecap and folding back when not in use, so

as to lie under the fore-end. The carbine and bayonet weigh just under 7 lbs. Its length, with bayonet extruded, is 40 inches, and it is considered to form an effective thrusting weapon for the cavalry soldier to use on horseback.

The United States have endeavoured to make use of a permanently attached bayonet in their new short rifle. A pointed rod lies under the barrel in the stock, being held by a catch. The catch being released, it can be pulled forward, and the catch again holds it. In this position it gives a bayonet weapon 4 feet 6 inches long. The rod can be detached altogether from the rifle, and is of diameter small enough to be used as a clearing rod. It is understood that this form of bayonet is not likely to be retained. Its limitation in size to the internal diameter of the bore entails a great want of strength. There is of course some advantage in the bayonet being inseparable from the weapon, but if it is to be strong enough for its purpose its weight is better carried on the waist-belt than added to that of the rifle. So carried it is available as a hand weapon when the soldier is otherwise unarmed. The knife bayonet has amply justified its existence.

There has constantly been a tendency to sacrifice strength to length in bayonets. Under excessive strain, however, even a well proportioned steel weapon must either bend or break. A blade that snaps is for ever useless. Good as is the cutlery of the Japanese, they have had many bayonets bent in the present war. The length, including the fixed bayonet, of the rifles adopted by different nations before 1880 was from 5 feet 11 inches to 6 feet 2 inches. Those of the present day measure as follows:—

	Ft.	In.	
France	6	0	
Germany	5	10	
Russia	5	9	
Turkey	5	7	
Japan	5	5	
Denmark	5	3	
Italy	5	2	
Eight other nations	5		1 to 4 ft. 10 in.
Great Britain (L.-E.)	5		1½
,, ,, (L.-E., short)	4		8½
U.S.A. short rifle, with rod bayonet	4	6	

Future Progress.

What then, are the indications of the lines which future progress in military rifles will take? To take first rapidity of loading. The automatic rifle will probably come some day, a rifle requiring only the pulling of the trigger to discharge each fresh shot. But it has disadvantages, both in complication and in weight. To exceptionally cold climates it would be ill-suited. Did we not read of Maxim guns which failed to work in the fighting in Tibet? Such difficulties have even interfered with the working of the ordinary bolt action; with more elaborate mechanism they may become serious. As regards rapidity of fire, it is well known that where the recoil is enough to shift the alignment of the barrel, the time necessary to recover the aim much limits the possible rapidity. The two automatic rifles tried at Bisley last July did not give a rate of fire so high

as has been attained by experts using the hand-operated magazine rifle. This was mainly because the recharging of the magazine could not be done with proper expedition. An automatic shot gun carrying 5 cartridges in a tube underneath the barrel has been put on the market, and is a useful weapon.

If an automatic rifle of sufficiently simple design can be produced, it is likely to be adopted at all events for certain purposes, as for defensive positions where there is no difficulty as to ammunition supply. And the moral effect of an automatic rifle is such, that if one great nation should adopt it, others are bound to follow suit.

On the other hand, it may be some time before any nation takes the plunge. Assuming a practical automatic rifle for infantry to be produced, the cost of re-arming with such a rifle would be very heavy. Mechanism is always expensive, yet in matters of national armament expense never stands long in the way of progress. Another difficulty is in the ammunition supply, a difficulty great enough even now in the case of a force moving rapidly away from its base. It would be much increased were the expenditure of ammunition in battle to be much added to. Automatic loading mechanism must certainly involve increased weight and a diminution of handiness.

We may conclude then, that the times are hardly ripe for the adoption of an automatic rifle. Meanwhile, the best opinion decidedly leans towards a rifle giving a velocity of 2,300 to 2,400 f.s., and we may, perhaps, see even higher velocities than this in use before long. To obtain such high velocities, the calibre is not likely materially to exceed ·256; for the weight and bulk of the ammunition impose a limitation on the bore. The action will have ample resisting power in lugs placed at the head of the bolt. The cartridge will be practically rimless. The weight is not likely to be reduced much below 8½ lbs.

The progress of military rifles has been very rapid in the last 25 years. To project a bullet weighing less than ½ oz. to a distance of 2 miles with great accuracy, and with such velocity that it will penetrate a foot of timber at 1,000 yards, was beyond the dreams of our ancestors. In rapidity and certainty of fire, and in simplicity of equipment, the modern soldier enjoys advantages which 50 years ago were hardly conceivable. As further openings for improvement arise, it will tax all our wisdom as a nation to take advantage of them at the right moment. To make no hasty change, yet never to be left behind in the march of improvement, is always a hard problem, and one even harder for a nation than for an individual. We cannot afford to neglect any of the lessons of experience, whether those of the South African war, or those of the conflict, much more typical of the fighting of modern land-Powers, now being waged in Manchuria.

Have we been right in remodelling the ·303 so completely? Would it have been wiser to add to it only the simplest possible mechanism for quick loading, as a temporary measure, and to have embarked at once on a rifle more up-to-date in certain respects at a much increased cost? Will the present converted rifle last us satisfactorily till yet greater changes begin to press? Such questions as these are not easily answered with certainty, since they imply a correct judgment of the future, yet upon a right answer to them much may depend.

Lieut.-Colonel C. B. Mayne, R.E.:—I have admired as much as anybody the moderation of the views of the lecturer upon the very vexed question that has been so much before the public of late. I cannot say that I know anything practically about the new rifle, so that I am not going to speak either for or against it. I have fired two bullets from it at a 30-yard range, and that is my only practical acquaintance with it; but I do protest most strongly against the arguments that have been used lately in the Press for the purpose of running it down. These arguments, which appear pretty frequently in different forms, have absolutely nothing to do with the battle-field. I have wondered whether the gentlemen who carried out certain experiments that have been alluded to in the Press have ever seen any active service, or, if they have, whether they remembered what takes place in action. The whole opposition to the new rifle seems to me to be based on the sole idea of pot-hunting over measured ranges, under conditions which are not in any way suitable to war. My protest is not against the new rifle, but against the arguments that have been used against it. The only way to test any new rifle as to its fitness for our Army is to test it on a large scale, with a large number of troops, under various conditions of field firing, and under conditions which approach those of war as nearly as it is possible to do so, and then to see what the results are, as compared with other rifles tested in the same way. Until that is done, I should waive my judgment on any rifle that is put forward, however theoretically perfect it may be, for reasons that you will see in a few moments. I may also say that only last week a gentleman, who has shot a good deal at Bisley, was complaining very bitterly to me that he had lately paid £9 for a barrel, and that he could only sell it for £2, because he was unable to certify that 300 shots had not been fired from it. In the present war, what is going on? Statistics have come home to us showing that the normal amount of ammunition that has been fired is about 400 rounds per day per man. Since that is the case, and if the rifle is perfectly true at the beginning of the day, what must be its condition at the end of the day, when 300 rounds make a difference in an accurate target-shooting rifle? At the end of the day it is practically not worth being considered as a good shooting weapon; and at the end of the second or third day you may imagine its condition. Some of the battles which have taken place in Manchuria have lasted ten and twelve days, and even longer, and I would like to see some of these rifles at the end of the tenth or twelfth day. As probably the barrels have never been cleaned out, the chemical action of the products of combustion must have eaten into the surface of the bore, while the metal-coated bullets have probably worn away the grooving of the barrels.[1] Where does your accurate shooting come in under those conditions? My own view of this matter is (and I daresay some

[1] A gentleman who was present at the lecture, and who had just returned from Manchuria, after seeing much of the fighting there, told me afterwards that what I had surmised about the condition of the rifles on both sides, Russian and Japanese, was perfectly true. But he added that my statement that the Japanese bullets mushroomed was not correct. The bullets used in the war had but little stopping power if they did not hit a vital spot, and the majority of wounds they made were not serious. He considered that artillery fire was *the* commanding factor on the battle-field.—C. B. M.

of you know I have studied the question for a great many years) that we should try and consider the conditions of the battle first, and then produce the rifle best fitted for that purpose. First of all there is the tactical effect. Major Fremantle has told you how the rifle was used for very long ranges in South Africa. Was it worth it? From all accounts I have heard of what took place in South Africa, no long-range firing was ever worth the expenditure of ammunition. In no instance in the fighting out there can I find a case in which our troops had any difficulty in getting to within 800 yards of the Boers; in fact, at Maggersfontein our troops lay from two to three hundred yards in front of the Boer lines all day long, and the losses only began when the retirement took place. Besides, the long-range power of the rifle is simply the effect of our efforts to get a low trajectory. We have heard a good deal about the high velocity, but it must be combined with the sectional density of the bullet. You can have a high velocity at very short ranges, but which will fall off very quickly, as in the case of the old spherical bullet. You must combine high velocity with high sectional density, and that is the reason for long[1] bullets of small diameter, in order to get a low trajectory for as long a distance as possible. Then comes the question of wounding power. A mere perforation is nothing. We know that in many of our wars, men have been perforated again and again with small bullets, and in the Tirah campaign we had Afghans coming in with five, six, or seven bullet wounds for treatment. High velocity must be combined with some stopping power. There was an outcry against the Dum-Dum ammunition, which made the bullet mushroom a bit; but my own impression is, from all I can hear, that the Japanese bullet and the French bullet do mushroom, and yet nothing is said about it. However, we gave way about it. As regards tactical effect, the ranges in battle are all fairly short, as we see in the present war. We often read of the combatants coming to close quarters with the bayonet; and we also read that they are throwing hand grenades. That has happened, in my opinion, for two or three reasons. One is that the eating away and wearing out of the barrels has made the rifles of both combatants perfectly worthless as regards accurate shooting; and in the next place—and this bears very materially on the question of the automatic rifle—when men have to lift and lower their rifles something between 300 and 400 times every day, they are physically done up; their fire is probably absolutely worthless so far as accurate shooting is concerned after raising the rifle 50 or 60 times. And for these reasons they are able to approach each other with comparative safety. That sort of thing going on day after day, with heavy marching and broken rest, and the men physically done up, accounts for the short ranges within which, even with improved weapons, combatants are nowadays able to get near each other. Then again, the power of vision of the greater proportion of our men, particularly in a country where we recruit so much from the towns, is governed by the length of the street in which they live. When they go out into the country they cannot see clearly very far, and it takes time to train their vision to enable them either to see well to any distance or to clearly distinguish objects at given ranges. We found that very strikingly exemplified in South Africa, where the Boers were stated to be able to see clearly two miles further than our men could. Then again, there is the invisibility of the enemy, which completely militates against our getting accuracy of fire at any range. Then

[1] That is, "long" as measured by number of diameters in length.—C. B. M.

comes the question of the adjustment of the sighting to the ranges, which is a very important matter. The lecturer has very rightly laid stress on the great need of a flat trajectory (*i.e.*, under the height of a man) for as long a range as possible, in order to reduce as much as possible the need for altering the sights by men excited by danger. The proportion of error in guessing ranges is so very great—probably one-sixth for the longer ranges to one-eighth for the shorter ones—that the theoretical percentages given by the lecturer are of very little value. Then comes the question of the expenditure of ammunition. As I have said, it is very great, and the mere lifting of the rifle up and down some 300 or 400 times a day must have a great effect on the men. Added to that, there are the questions of the energy of recoil, the making use of cover, and snap-shooting. All these items weigh a good deal in considering the question of the length of the barrel. Moreover, the convenience of movement on the battle-field has not been considered in any of the discussions on the new rifle. Those who have been in India know that the Government of India allows officers to get rifles from the ordnance factories, which rifles remain their property while they are in India. When we used to get the old Martini-Henry it was converted into a splendid sporting weapon by cutting off the fore-end from about an inch above the lower band. That improved the shooting most wonderfully. Perhaps our lecturer will consider that point, as I feel pretty well certain the real reason of the inferior shooting of that rifle, with the fore-end and upper band left on, was because the upper band squeezed the barrel, and as there must be a wave of metal as the bullet swags up the barrel, the bullet is checked by the band near the muzzle. It is probable that that check has been relieved in the new rifle, partly by the deepening of the grooves near the muzzle, and partly by the new method of attachment to the fore-end, which may account for the better shooting and the increased velocity that has been obtained by their introduction. Moreover, for all our small game shooting out there everybody went in for the short Lee-Enfield cavalry carbine, which was a very favourite weapon for deer shooting in the jungles, because it was so convenient to get about with it under cover and over rough ground. Even leopards have been shot with it. It is lighter than the rifle, and therefore lightens the load to be carried, on which so much stress has been laid. It was said that the rifle ought to be lightened in order that the men can carry more ammunition. That I do not think is needed. On the line of march you need not carry more than 50 or 60 rounds, and when an action is imminent, the remainder required for it can be issued. If a good rifle can be obtained by increasing the weight, the ammunition question can be dealt with in other ways. I have spoken of the wounding power of the bullet. The ·256, if you can get it to set up in any way, would have sufficient wounding power. We know that the present ·303, which does not set up, has not sufficient wounding power, and will hardly stop horses. One of the dangers to infantry of a cavalry charge in modern fighting is the inadequacy of the modern bullet to stop cavalry, unless it can be made to set up. With regard to the question of accuracy, the accuracy of modern rifles is far greater than the vast majority of men can make use of. All those who have been in action know that the men cannot make use of the accuracy of the rifle which is put in their hands, owing to the limitation of their power of vision, their fatigue, and the excitement of battle. I would like to ask those gentlemen who have been in action how often they found their men change their sights, when once within 800 yards from the enemy. The accuracy of the rifle depends on the sighting; and

in the great excitement the men will not change their sights. What constitutes the great value of a low trajectory is the fact that the men need not bother about the sights after a certain period. All firing in battle can only be a fire of probability, that is, endeavouring rather to cover certain areas of occupied ground with bullets, expecting a certain percentage to hit, rather than any idea of accurate marksmanship, which is a condition we never can reach. It is futile to ever try and reach it, and we should take up the more sensible position of covering occupied areas of ground with bullets, especially where we can see where the bullets are falling, and hope that some fair proportion of them may hit the enemy. With regard to the question of the distance apart of the sights, of which so much has been made, it would make a good deal of difference to a good Bisley shot as to how far the sights were apart, but to ninety-nine out of a hundred in the Service a few inches one way or the other make no difference at all. I know it makes no difference to me; but I do not claim to be a good shot; in fact, I shoot just as well with a short as with a long barrel, simply because I am unable to make use of the extra accuracy given by the longer distance between the sights, and ninety-nine soldiers out of a hundred, or perhaps more, are just the same. As a matter of fact, the whole of this question really turns upon trying the new rifle against the old rifle with a large number of men at field firing, not for one day only, but for several days, and then to see what the results are. That is the only test which will be of any practical value. Something should be said about the thickness of the metal of the barrel, which must have a very great effect on the accuracy of the rifle, and the wave of metal that must go up in front of the bullet, and which is checked by any band fastened around the barrel. Therefore, it is of great importance, for several reasons, to have the bayonet on the fore-end, and not on the barrel. You will see in the new rifle that the bayonet has nothing like the same effect in altering the trajectory for any given sighting as it had in the long Lee-Enfield, because it is now fixed to the fore-end and not to the barrel. If it is fixed to the barrel it affects the vibration very seriously, and therefore alters the throw of the bullet altogether. It does not do that anything like to the same extent in the present rifle. In conclusion, I would like to say one word about the automatic-loading rifle, which is the one thing the lecturer has thrown cold water upon. I think by a slip in writing he has mixed up the question of the rapidity of loading with that of the rapidity of firing. Rapidity of firing, I admit, is almost absolutely useless. Men can fire away any amount of ammunition in a very short time and hit nothing; but rapidity of loading is a most valuable factor in a military rifle: to always have a cartridge ready in case of need. I have spoken of the constant raising and lowering of the rifle. With the automatic rifle you only have to raise and lower it one-tenth the number of times, supposing you have 10 bullets in the magazine, as compared with the ordinary rifle. Moreover, since you do not have to bring the rifle down after every shot, you stand a far greater chance of hitting an advancing target, as you do not have to take your eye off it. We know that the Boers charged through our lines in the South African War, and we also charged through their lines; in these cases the rifle had to be brought down quickly, loaded, and brought up again, and under those circumstances, combined with hurried aiming and excitement, you cannot get accurate shooting. With the rifle up you can follow your man, and I believe the majority of men would drop a charging enemy long before he got up to them if they did not have to bring their rifles down every time, which is a very strong reason for

using the automatic rifle. It reduces the recoil, it reduces the fatigue of lifting the rifle, and you get much better shooting results, especially, as I have said, at charging cavalry. The question of the expenditure of ammunition has been referred to; but that argument has always been used when any new rifle has been introduced. Lord Roberts and others gave evidence before the War Commission that our soldiers in a very short time learned to value their ammunition, and would not throw it away after their first experience. Hence in every way I do think it is our duty, especially in a small Army like ours, and with a rich nation such as we are, that we should get the most perfect weapon we can for the few troops we can afford to put into the field—few as compared with those of other nations. I think the question of using the automatic rifle should be very seriously considered. We should not wait for somebody else to bring it forward, but we should try and find out for ourselves as soon as we can how to get a good automatic rifle, combined with a bullet that will unfailingly stop any kind of enemy. Let us give up the idea that we must not have a mushrooming bullet—we must have it, and also a bullet with as low a trajectory as possible at all ranges. These three elements, together with the accurate and good manufacture of both rifle and ammunition, are the chief requirements for a military rifle, and not merely those necessary for a rifle for target shooting at Bisley.

Major P. T. Godsal (late 4th V.B. Oxford L.I.):—I am sure we are all very much indebted to Major Fremantle for having collected for our instruction such a mass of detailed information about such military rifles as have been adopted by the various nations of the world, and I also thank him for having mentioned my own rifle. The lecturer has not summarised the conclusions to be drawn from the numerous facts that he has laid before us, but I gather that the questions with which he concluded his admirable lecture were intended to invite his audience to draw such conclusions for themselves, as the facts seem to warrant, so that we may be able to help one another to form rational opinions as to the problems of the near future. It is interesting to hear what other nations are doing, and consolatory to know that in some details other nations have done the same as we have, but the most serious point in the whole lecture is the fact that in the important matter of strength of breech mechanism we are hopelessly outclassed by other nations, more especially as any further improvements in ballistics are dependent upon a strong breech mechanism. The time was when the rifle makers of England used to show the way, to lead and not to follow, and I am sure that if the slightest encouragement were given to them they would do so again. At any rate, our military advisers are leading the world in their absolute demand for a shorter and lighter rifle. But, judged by the new short rifle, there is a lamentable lack of capacity on the part of our rifle designers. The only way to shorten the rifle that they can think of is to cut 5 inches off the barrel, and the only way to further lighten it is to pare down the barrel. Beyond this we have but a few unimportant details to record, and the only real piece of original design of which we can boast is that we have crowned the bolt-head with what can only be described as a sliding outrigger called the charger guide. The breech mechanism still remains a mere conglomeration of compromises, garnished with makeshifts, a poor sort of affair to spend 3 millions on. It is dependent upon superlative excellence of manufacture for its working at all with safety. By a compromise I mean a piece put into an action for one purpose and made to do for another, for which it is not suited. By a makeshift I mean

a piece put into an action to prevent another piece going wrong. The time has come, as I am prepared to prove, when compromises and makeshifts should be abolished, unless it can be shown in particular instances that any particular advantage accrues from their use. After long consideration and much practical experience, I have come to the conclusion that we have perhaps, the best barrel and an excellent cartridge, but the very worst breech action, and we shall never get a really effective rifle until we have a breech action that is capable of doing justice to the barrel and cartridge. The characteristics of our action are weight, weakness, and complexity, entailing mutilation of the barrel to relieve weight and reduce length, reducing of the charge to spare the weakness, and complexity entails great expenditure. The facts all point to the breech mechanism being the crux of the whole question. Although no nation is completely satisfied with the breech action it has adopted, yet the lecture brings out very clearly the fact that we are far to the rear in the march of progress since it is becoming universally recognised that a front-locking-bolt is necessary, as nothing less strong will resist the pressures that must be developed if the full ballistic power of the barrel is to be got out of it. But I appeal to the unsophisticated judgment not only of nations but also of individuals. No nation will look at our rifle action, and no individual either (excepting so far as he is influenced by the fact of its being the service weapon). The consequence of this is that the service rifle is killing the rifle trade of this country, and acting as an incubus on progress, since no one can afford to take up an improved military rifle without some sort of Government support. But I do not hold with empty criticism without suggestion, although candid criticism has its uses, as the first step towards getting a want supplied is to show clearly what is wanted. But I have always preferred suggesting to criticising. My suggestion is, that we approach the question as a definite mechanical problem, capable of a definite solution. Do not let us go looking round to see what the others are doing, like a school boy trying to crib at an examination; let us make up our minds that we will have no compromises and no makeshifts. It is perfectly easy to make a rifle action without any compromise or makeshift about it, and that instead of being the weakest shall be the strongest; and instead of being one of the heaviest, shall be far and away the lightest; and above all, much the cheapest and easiest to manufacture. Do not go fussing about the future, and whether we are to have automatic rifles or not—that is putting the cart before the horse. Depend upon it, if we are to have automatic rifles the first essential will be a sound breech mechanism to make automatic. Face the problem boldly, and you will find it perfectly easy of solution. I have done so already, and I shall be pleased to show you how to make a military magazine rifle without a compromise and without a makeshift, stronger, lighter, and cheaper than any other, and that will enable you to shorten the rifle without mutilating the barrel, that shall feed cartridges into the magazine and eject as well as our present service rifle, and that although it is best made with an undivided stock, yet it can equally well be made with a divided one, so as to use up the wood that we now have stored for the purpose. If anyone wants to see a rifle of this class I shall be happy to show them afterwards, as I have one in the Museum. At any rate, I hope that this meeting will demand fair play for English inventors, more especially when they undertake themselves the labour of designing and improving their own inventions, and bring forward a new principle of rifle construction. Do not let it be said that England must go on her knees to foreigners to get them to

design arms for her soldiers. The powers that be will incur a very serious responsibility if they insist upon forcing our soldiers to drag about with them rifles that are more than half-a-pound each heavier than they need be, at the same time that they have the weakest action adopted by any first-class nation, when the strongest action is half-a-pound lighter. If there should be any that could not stand the kick of such light rifles (though it would be far less than that of the Martini), let them have their rifles weighted, but do not force 990 men to carry half-a-pound extra because 10 men cannot stand a mild kick from their rifles. There is no reason why rifles with the long barrel should not be reduced in weight to 8¼ lbs., and with the short barrel to 7¼ lbs., and the length in each case be reduced by 4¼ inches. At any rate, I do hope that this meeting will not disperse without demanding fair play for English inventors in general, and English breech mechanism designers in particular. It is no child's play to design a breech mechanism from start to finish. Let anyone try it and see. But the designing and perfecting of a new breech mechanism has this effect, it makes one who has made the effort, feel very charitably and sympathetically indeed towards all those who have had a share in the very arduous and onerous task of providing a small arm for his country. I know as few men can what a difficult work they have had, and I feel absolutely certain that under very difficult circumstances they have one and all done their best. But they each and all lacked one essential, they all wanted time and opportunity to sit down and quietly study the problem as a whole. I have been able to do this, and I feel sure that if there are any defects in my work they are due to immaturity of design, and not to unsoundness of principle.

Lieut.-Colonel Ivor Philipps, D.S.O., 2nd in Command Pembroke Imperial Yeomanry (late Indian Army):—I think we should all be very much indebted to the lecturer for the clear way he has stated all the essential points of a modern military rifle. I think the last few paragraphs really contain the crux of the whole question, namely, those in which he considers what the rifle will be in the future. Surely the new short rifle has not one single essential point that the lecturer considers a modern rifle ought to have. I think I am right in saying that it has not got the velocity, the calibre is larger than he recommends, the lugs are far back on the bolt and not in the front, as they should be, which necessitates low pressures, limits the power of the cartridge, and, in fact, generally limits the fire of the rifle. He shows us that, with the exception of the Portuguese rifle of 1886 and the Danish rifle of 1889, the new short rifle is the weakest rifle in the world. I do not think it is very creditable that a great country like England should now start making a new rifle that is actually weaker than the rifle Denmark and Portugal adopted 20 years ago. I do not think anything much worse could be said of the new rifle for this country than that. Again, we still stick to the old rim cartridge, while everybody else has adopted the rimless cartridge. The Japanese, with their usual intelligence, have adopted a semi-rimless cartridge, thereby getting all the benefits of the "rim" and of the "rimless" cartridge. The supporters of the new short rifle appear to me to have very little to say in its favour. The most they can say is that it is as good as, or nearly as good as, the old one. Surely after all these years we might go a step further! The supporters of the Lee-Enfield say: "Oh, the Boers liked it; it must be a good rifle, because when the Boers got hold of it they always used it in preference to their Mausers." I think that is a very weak argument. Everybody knows that all service rifles wear out, and many of the Boer

rifles had been a long time in use. Then it is well known that the Boers were very often short of ammunition, and unfortunately they managed to get hold of a good deal of our men's ammunition. What was more natural, under those circumstances, than that they should also use our men's rifles when they fell into their hands? I think it is quite possible that at the present moment, when the Japanese are pursuing the Russians hard and fast, many of the victorious Japanese are using Russian rifles. It is quite within the range of possibility that the advanced Japanese troops have got beyond the limit of their own ammunition supply; and is it not therefore possible that, as they have captured a great deal of Russian ammunition, they may be using Russian rifles? But that would not be an argument that the Russian rifle is better than the Japanese. It is feeble arguments like that which are brought forward in support of the new rifle. If the Small Arms Committee recommended the new rifle as the best rifle obtainable, we should then know that we had an expert body of men who guaranteed its superiority; but we are specially told by the military authorities that the Small Arms Committee were not asked to select a new rifle or recommend the best obtainable, but were told to improve the present rifle. Lord Roberts made the remarkable admission in the House of Lords that the Small Arms Committee could not have taken up the question of a new type of rifle if they had wished to do so; Colonel Ian Hamilton's Committee was formed to consider and report on the best practical method of lightening the present rifle. I may be wrong, but I believe there is no evidence before the country that our leading soldiers have considered the question of a new rifle or of the best rifle obtainable, but only the improvement of the old one. We know that Lord Wolseley was dead against the shortening of the barrel as far back as 1898. Six years afterwards we are going to do what was condemned then. I think that alone is enough to condemn the present scheme. No attempt has been made apparently to find out if there is a better rifle on the market. That is the whole point. I may be wrong, but I believe there are better rifles on the market, and I believe that is the opinion of all those who take an interest in the subject and examine the question in an impartial manner. I think they will agree that the breech mechanism of our present rifle is not a good one. It is a makeshift, and it always was a makeshift, and no tinkering with it can improve it.

Lieut.-Colonel F. N. Maude, C.B., *p.s.c.* (late R.E.), O.C. 1st Hants R.E Vols. :—I should like to take this opportunity of supporting every word that Colonel Mayne said on the whole question of rifles. It seems to me a pity that in an Institution like this, when a question of this sort is under discussion, that somebody at least should not rise and make a protest against the wholesale way in which anything that is proposed in the way of new armaments is invariably condemned by the Press. In the field, the advantage of superior handiness and lightness far outweighs all considerations of target accuracy, and we have gone too far already in the sacrifices to man-killing power we have made to secure such extreme accuracy, which, under the rough usage all war weapons must expect, is very soon lost in practice. If I had prepared myself to speak on the subject I could have given a number of figures to show some of the extraordinary things that have been happening since we got these new high-velocity long-range rifles with small bores; but, roughly, you may take it that whereas in the Franco-German War it took about 1,000 rounds of the Chassepot to place a German out of action, in the Boer War

it took about 10,000 rounds of the Lee-Metford to disable a Boer. So that you therefore have the curious fact that though you have an actual reduction in the weight of the cartridge of about 50 per cent., you have to use ten times as many cartridges to get the same result. It would take too long to work out that problem now, but I think if anybody will take the trouble to go thoroughly into it, they would find that from the point of view of collective mobility what we want is a more powerful rifle with a big smashing bullet, which would actually transmit the ballistic effect generated in the barrel to the body of the person for whom the bullet is intended. What object can there be in having rifles which develop so much ballistic power and convey it up to so many miles distance, and yet fail to bring down the horse or man you want to stop? There are many here who probably remember Ahmed Khel in 1879, and probably some who can recall the different appearance presented by the fronts of the lines where the British troops stood with the Martini and where the Sikhs and the Gurkhas stood with the Snider. An eye-witness told me afterwards that the Snider bullets stretched the enemy out in swaths, dead, but the other bullet hardly stopped them at all; they came on and died afterwards. That was not what we wanted, we wanted them to die then. High velocity and flat trajectory are not the only desiderata in modern military rifles; what we want is a bullet that will do its work and kill.

Major F. E. VARLEY, H.A.C.: — Major Fremantle has so well covered the ground of the subject of the lecture that I am afraid I have not very much to say; but he did not refer to the possibility of the introduction of another sight. I believe with a large aperture sight you will produce a rifle that would give great rapidity of aim. I do not think the present sight is by any means the end of military sights. What I more particularly rose to refer to was the somewhat scathing remarks of the first speaker on the subject of the tests carried out at Bisley. I was one of the seven gentlemen asked to test the gun, and I think he rather misunderstood the view we took of it. Compared with the long rifle, we found it to be a less handy weapon; it is too heavy in the nose, and we found that the sight protectors that the author referred to were very balking for taking rapid aim. We also found it less accurate and less handy, and the kick is greater. It is not materially greater to any man who can handle a rifle, but anybody who has spent a number of years, as I have, as an instructor will know the enormous difference it makes in teaching a man to shoot. As regards the number of rounds fired in active service nowadays, I do not think that at any time during the Boer War, where the rifles were really well handled, anything like the number that the speaker mentioned were used. I will put it to the meeting that at the present moment the Russians are using the worst ammunition in the world, so far as my experience goes, and they are absolutely the worst trained Army in the world from a musketry point of view; in fact, there is hardly a man amongst them fit to fire a rifle. If you go back in history you will find that the British infantry has always been recognised as about the finest fighting unit, and really their efficiency has depended on two points: the coolness and the accuracy with which they handle their weapons. Even going back to the time of the long-bow, it was almost as effective at 100 yards in the hands of an expert archer as a magazine rifle; in fact, the damage they could do was so great that they were practically invincible. So it was right through the Peninsular War. You will find that the English infantry was trained to target practice, and trained to handle their weapons in times of peace. If you read history you will find that

the men who fought under Napoleon all over Europe when they were brought against British infantry were staggered with the accuracy of their fire. Owing to the power they acquired of handling their weapons they acquired a confidence which allowed them to wait until the enemy was within easy striking distance, when they could make the fire effective, and that is the great argument for accuracy. The first speaker advocated accuracy, and then he said it was impossible; and at the finish he said the great advantage of an automatic rifle would be its further accuracy. But I do not think that is the question. The point that is uppermost in my mind is that the great number of rounds fired in the present war is simply due to the fact that the people who are using the rifles do not know how to use them.

Major-General Sir E. T. H. Hutton, K.C.M.G., C.B.:—I do not hold a brief for the War Office, nor do I propose to enter into a controversy as regards the advantages of the rifle that is to be or the rifle that is; but I would like to remind this meeting, at any rate, those present who are as old as myself, of the controversy that took place over the adoption of the present ·303 rifle. If they compare the comments, and, above all, the leading articles in the *Times* in 1889 on the subject, with those that have appeared lately, they will find that practically the self-same arguments were used against the adoption of the ·303 magazine rifle then that are held now against the adoption of the new shortened rifle. Not only are the public very ready, but I think perhaps my military comrades are equally ready to criticise anything new. Whatever may be the merits or demerits of the new rifle, we may be quite certain of this, that it has only been adopted after most careful thought and after most careful tests. If Colonel Mayne will allow me I should like to make one or two comments with reference to the able and interesting remarks he has made upon the paper. In the first place, with regard to sights, he has stated that it is his strong and firm belief that the nearness of the sights does not affect the accuracy of shooting. Whatever it may do at a range and at a target, it very materially affects the accuracy of the shooting in war, under conditions of active service, and above all during the critical time of a fight. I feel sure that those present who, like myself, have been often in action, will endorse what I say in that respect. This I know for certain, that in the Boer War of 1881, when it was my privilege to serve with a mounted infantry corps armed with carbines, there was some misapprehension on the part of some authorities at home of the value of a long rifle. Our men on the spot were fully aware of the fact that they were armed with an inferior weapon to their opponents, and at the commencement of every action they had that instinct which it is most unfortunate that soldiers should have, namely, that they were armed with an inferior weapon to that of their opponents. The principal reason which made the carbine an inferior weapon to the rifle for use in action was, in my judgment and in the judgment of most soldiers, the nearness of the sights together. The lecturer has told us that the sights in the new rifles are only 19 inches apart. If that is so, I think that it is a very serious detriment to the advantages of the new rifle in regard to battle requirements. I also most strongly endorse the views which Colonel Mayne has given as regards the automatic rifle. It was certainly the hope of many of us, certainly those who were associated with me recently in Australia, that we should see in this country a great development in the use of the rifle, and that in place of Great Britain being content to follow Continental Powers in the matter of rifle power, we should take the lead.

To follow, after all, is to be left behind; and we did hope in Australia, where these things are very closely considered and very carefully discussed, that as a change was to take place in the small arm that was to be used in the British Army, that an automatic rifle would take the place of what we know now must in a very short time be superseded. I am quite at issue with the view that Major Fremantle has stated in his paper as regards the bayonet. I am not aware that the sword bayonet has proved the success which he claims for it. The question is, what is the bayonet for? Is it a weapon of offence and for thrusting purposes, or is it a general utility weapon of the character of a hunting-knife? If it is to be used as a weapon of offence, I claim that the present sword bayonet does not sufficiently well fulfil its purpose. Perhaps I may quote from my own experience. I was in 1884 in Cairo organising the Mounted Infantry Camel Regiment, for service in the Soudan, and in organising that regiment I had carefully selected detachments from all the different infantry regiments in Egypt at the time, and many who were at home. I consequently had among the men an enormous number of soldiers who had seen a good deal of active service. New rifles were issued to us with the old sword bayonet, which in many respects, as you are aware, is much like the present sword bayonet. Within a few days after those rifles and bayonets had been issued I was asked by my adjutant if I would receive a deputation from some soldiers who wanted to make a representation to me. I agreed, and three sturdy old soldiers, who had served in three or four campaigns in the mounted infantry in different parts of the Empire, appeared. It transpired that they came to report, on the part of their comrades, the fact that the sword bayonet was a weapon which was entirely inapplicable to the purpose for which they understood the bayonet was given to soldiers, namely, to kill their enemy. In their homely language they explained that they "could not get it out and they could not get it in." Gentlemen, I fully sympathised with those old soldiers. I recall the magnificent work done by the Highland Brigade at the battle of Tel-el-Kebir with the old bayonet. The bayonet work they did against the Nubian regiments, only those who were there at the time could possibly picture to themselves. With regard to Colonel Mayne's remarks in reference to mounted troops, it has been my good fortune in the last 25 years to be concerned in the organisation and in the leading in peace and war of mounted troops in various parts of the Empire. I feel sure of this, that the next great development of the mounted troops will be that they will be armed with an automatic rifle, and that that automatic rifle will be provided with a rapier bayonet. I hold that mounted troops so equipped will form the most formidable arm for offence and also for defence that it is possible for modern military science to employ. I do not suggest that the rifle will be fired from the shoulder, but horizontally from the side, as we have recently been doing with the Australian Light Horse. We shall see, I anticipate, within a few years important developments in regard to the handling of mounted troops. We have yet to realise the enormous power we possess in mounted troops, armed with good rifles: and the development indicated will, I venture to prophesy, be adopted in the very near future. I entirely corroborate what Colonel Mayne has said as regards the action of the mounted troops during the South African War, and I may also add that recently in Australia we have been carrying those tactics into effect. The squadrons and regiments of the Australian Light Horse have been firing mounted with fixed bayonets, and have been trained to charge and to close with the enemy in that manner.

Mr. JOHN RIGBY :—The fact that has struck me most in connection with this lecture is that such a rich nation as ours cannot afford to arm the few hundred thousand men it possesses with the best arm in existence. In this respect we cut rather a poor figure compared with the Germans, who rearmed their enormous forces with a new rifle—the Spandau—about the same time that we adopted the Lee ·303. In 1898, only ten years after, they did not hesitate to supersede the Spandau by a new pattern, embodying all Mauser's improvements. The British Committee which has been sitting for some years appears to have been instructed that it was only to alter a rifle which was known not to be up to the mark compared with the latest arms in Europe. To show the activity with which the arm manufacturers in Europe pursue their calling, not only in making guns but infantry rifles, I glanced through the English gun patents this morning, and I found that just about the time General Smith's Small Arm Committee was sitting, and had decided to adopt the Lee-Metford—which was just before I had the honour of being elected to the service of the Crown—in the years 1887 to 1890 inclusive, Mauser took out twelve English patents for improvements in rifles, and a further two in 1891, so that altogether he took out 14 English patents in five years. Some of those patents embodied important improvements in the Mauser rifle, which has held a premier position in Europe from that day to this. Those patents have expired in England by efflux of time, 14 years. Consequently a Committee meeting now would be able to utilise, without infringing any of the patents, some of the most important improvements that have been made since the Lee-Enfield rifle was adopted. I remember very well when the Lee gun was before the Committee that several rifles were submitted to the Committee by different European manufacturers, French, Austrian, German, and others. They were all heavy, clumsy weapons, some of them up to 10 lbs. in weight; but in that particular year and the following year improvements were made in the bolt and in the lugs; the Mannlicher and the Mauser people both introduced improvements. It has been a disputed point as to who invented the bolt with lugs in front, but that does not matter; there they are for anyone to use. I have always noticed a very great unwillingness on the part of our Government to touch anything which involved paying for patent rights; but the action it took in the case of the Lee-Metford rifle was about the worst, in my opinion, for manufacturers in this country that could possibly have been chosen. They decided to pay a sum of £50,000, I think it was, to the Americans who had liens on Lee's patent, and then to allow those patentees who had taken out English patents for modifications adopted by the Committee, to put on any fancy royalty they chose, as against the general public or foreign buyers. The consequence was that it was impossible for manufacturers to place a large contract. Even then, when the Lee-Metford rifle was in very good odour, it was impossible for the Birmingham Small Arms Company or any other Company in fact which chose to embark in the manufacture of rifles, to place those contracts at a price to compete with the Belgian or German manufacturers. The patentees, who had not been fully satisfied by the Government as against the whole rights of the patent, insisted upon the payment of something like 14s. per rifle for royalty, which the manufacturers had to pay on every rifle (except those made by Government) and to charge with its proportionate profit in their estimate for the supply. Consequently, when enquiries came from different places, such as Mexico and Peru, they found that the English price for the Lee-Metford was something like 25 or 30 per cent. higher than the German price for rifles

with later improvements. There will be a demand in England, and probably in the Colonies, for the new rifle. It has been publicly stated that contractors for their manufacture have been forbidden to supply any to the public until certain patent rights held over them have been adjusted. I sincerely hope that this adjustment will remedy the state of things I have described, and that whatever pattern of rifle may be adopted in future or now, the War Office will acquire the patent rights on such terms as will free the British manufacturer from any further payments to patentees.

Major GODSAL :—The last speaker stated that it was a question whether the Mannlicher or the Mauser people were the first in the field with regard to front-locking bolts. I beg to say that my rifle was used, in the interests of the Mauser Company, to prove that an Englishman had been the first to adopt front lugs, and so that the claims of both had been forestalled.

Major the Hon. T. F. FREMANTLE, in reply, said :—I think it is a great presumption for a man who not only has never seen action, but who is not even a Regular soldier, to have read a paper on what is essentially a technical military subject to such an audience as this. I am very grateful for the kind way in which the lecture has been received. Nothing could have been more interesting to me than to hear the comments upon it which have been made this afternoon. Perhaps, I may briefly allude to one or two of the points which have been raised. Colonel Mayne spoke of the question of having a good sectional density of the bullet for flight. I thought I had made it clear that we all assume that to be a first necessity of any military cartridge in these days; as a matter of fact, there is not very much difference between the cartridges of the various Powers in this respect. I have never been into the question of the number of foot-pounds which it takes to raise and lower a rifle several hundred times in a day for aiming; I think that that cannot be a very large proportion of the whole work that a soldier has to do in a long day's fighting, in which he fires 300 or 400 rounds. There is one difference of weight between our long and short rifles which comes in, and that is, that you do not now carry the oil bottle and the pull-through with the rifle, and that makes a certain reduction. With regard to the number of rounds that a soldier should carry, it seems to me that military opinion would be rather divided on the suggestion that a soldier should only carry 50 rounds. It is a matter on which I am not in the least competent to speak, but I should have thought that modern experience pointed to our carrying more rounds than that. As regards the question of accuracy, I hope I should be the last to wish questions of ideal or theoretical accuracy to interfere in the least with the practical utility of a weapon. At the same time, I think it would be quite wrong to introduce unnecessarily anything like a cultivation of conditions that tend to inaccuracy. I think that, just as the pace of the caravan has to be regulated to that of the slowest animal with it, so the quality of your military arm should be regulated to whatever can be got out of it by the most skilled men under the best circumstances in which he may have to use it upon service. With regard to the question of bayonets, which Sir Edward Hutton raised, I am quite unable to say on my own authority that the knife bayonet has been a success. He thinks not, and he thinks so, it seems to me, largely as a consequence of criticisms passed by those whose experience was an experience of savage warfare, and of fighting even, perhaps, against swords in the hands of infantry. That,

again, I think, is a question upon which military opinion would by no means go unanimously with him, and I look with the greatest possible interest to the Russo-Japanese war in that respect, where on one side you have a triangular bayonet exaggeratedly long, and on the other you have a moderate knife bayonet. As regards automatic rifles, my view is briefly this, that until somebody has managed to solve the difficulties of creating a simple but efficient automatic loading mechanism, such that it really does meet the requirements of a military arm, we must perforce be content with doing without them. So far as my limited knowledge of automatic rifles goes, I do not see that we have arrived at the point, or that we are quite close to the point, at which such a rifle would be practicable for use by troops. I must confess that after hearing what has been said this afternoon about the great number of rounds which it takes in these days to kill a man in battle, I have been very much surprised to hear the suggestion that there should be firing from the hip either with or without an automatic rifle. It is, I think, a matter of great difficulty to know at what moment you should abandon your old pattern of breech mechanism, and go in for the expense of an entirely new rifle; because the setting up of new machinery for making a new pattern breech action entails an expense vastly in excess of that which is necessary if you only modify existing designs in certain details. I am not competent to speak with accuracy of the figures which would be involved, but undoubtedly the difference is very considerable. In conclusion, I should like to thank my audience for the very kind way in which they have listened to my paper, and for the equally kind criticisms which have been passed upon it.

The CHAIRMAN (Major-General Sir Thomas Fraser, K.C.B., C.M.G.):—We have seldom had a lecture so clearly expressed, and which contains such valuable facts for everyone who is interested in the subject of rifles, than the lecture we have heard this afternoon. It will enable the people of this country to judge for themselves about many of the questions connected with small arms. My few remarks will be confined mainly to one point which is interesting the country and the Army at the present moment, namely, are we right, pending a serious re-armament, in adopting the short rifle that is proposed as a temporary measure; instead of adhering to the old one with necessary improvements? Lord Roberts, with his usual lucidity, explained in the House of Lords the other day, what really had happened. Some years before the war, an attempt was made, and most fortunately failed to substitute the L.-M. short carbine for the L.-M. rifle, for infantry as well. What led to it was the fact that with the new powders a substantial muzzle velocity can be got with a short barrel. After the war, it became evident to everybody that the state of the barrels of our rifles was such that we must very speedily replace them, and that the sights must be improved. What also became evident to everyone after the war, as it had been evident to some of us before, was, that it was impossible to go on without bringing our rifle on a par with rifles of other Armies in the matter of quick-loading. Among other things, it was thought it would be well to have only one rifle for cavalry and infantry, because it was supposed that the cavalry could not carry a long rifle, and because it was more convenient for supply to have only one pattern. There was also the notion that a shorter and lighter rifle was more convenient for British infantry; while the grave question of the barrel vibrations, disclosed by recent photographic experiments, might also be dealt with at the same time. All those points led to the idea that it would be quite a simple matter

to shorten and improve the rifle; and that, instead of improving the Service arm, we could, by using machinery already existing, quickly get a short rifle that would fulfil expectations and that would meet our wants, till the next re-armament. But, as time went on, it was evidently found that difficulties occurred with the short rifle itself. A number of arrangements had to be made to get over these difficulties. It did not, apparently, act as well as was expected, and shifts had to be gone through, and new machinery had to be made, all of which involved delay before the short rifle was brought up to a condition which was thought to justify its replacing the Lee-Metford. Were we wise to make this change, which involved us in a costly rearmament, and one of a temporary nature only, in addition to the delay of two years? Had the short rifles been at once tried under identical conditions (of improved sights, same muzzle velocity, vibrations of barrel, etc.), with new long rifles, both in the hands of the troops and on a very large scale, it is a matter of opinion what the result would have been; but we would have learnt where we were going, and could have set the gain, if any, against the cost and time of rearming. We have, however, lost a great deal of time. An early form of this short rifle, admirably sighted, better protected against vibratory disturbances, admirably fitted, much better than rifles turned out in the gross are fitted, was apparently tried against the Service rifle in the hands of the troops, when the barrels of the rifle must necessarily have been in a very poor condition. There can be no question whatever, the Service rifles in use had worn barrels, we cannot say how worn, but at all events, to a certain extent; barrels that had sights of a pattern very inferior to the sights put on to the short rifle, and sights that, it was found in the war, were also badly adjusted individually. The Field-Marshal stated the result of the trials was, that the one shot about as well as the other. Many soldiers and riflemen think that with the longer barrel the man shoots better than with the short one. For, whatever devices are used in the position of the sights, the possible distance between them varies as the lengths of the barrels. They may be quite wrong, but no reliable evidence exists in this case. All that is necessary is to show that the final short rifle tried under identical conditions of improvement with new L.-M. rifles, equally well finished, shoot so much more accurately than the other as to justify the extra cost. The saving of weight is only that of the 5 inches cut off the L.-M. barrel, say 6 or 7 ounces, but every other method of lessening the weight of the short applies equally to the long rifle. It seems regrettable that that was not done, and desirable that it should be done now, before the infantry is rearmed. There are other not unimportant side issues, but this is the main one. We have to think of the confidence of the troops, and nothing short of an effective comparison will secure that. In peace, of course, men would prefer to carry a revolver instead of a rifle. A remark was made here, I am sure inadvertently, rather derogatory to gentlemen who so kindly came forward and assisted at the recent Bisley trials. Many of us think it is a very important thing in this country that private sportsmen and marksmen should take an interest in so important a national question, though the proper test of a military rifle is its exhaustive trial in the hands of the troops themselves. We think, also, that it is very desirable the Press should do so as well. In my opinion, the country owes a great debt to the Press for taking up this question from an outside point of view. The very pleasant task now devolves upon me of proposing a hearty vote of thanks to Major Fremantle for the extremely able and interesting lecture which he has given us.

THE VOLUNTEERS IN 1905.

By Colonel the Right Hon. Sir J. H. A. MACDONALD (Lord Kingsburgh), P.C., K.C.B.

Tuesday, 11th April, 1905.

Colonel LONSDALE HALE, late R.E., in the Chair.

FORTY-SIX years have passed since the month when the first Volunteer was enrolled in 1859. It is quite certain that no one, from the Secretary of State for War down to that humble recruit—whoever he was—had the slightest conception of what the Force would become which then, at the first word of official sanction, sprang into existence. There can be no doubt that it had its origin in a genuine movement of patriotic feeling, roused by the attitude of menace taken up against us in a certain military circle abroad. As a demonstration, it could not have been more effective. Everywhere there was enthusiasm. The enrolments became from day to day more numerous, and before many months had passed there was not a town of any great size which had not its battalion, and every country town had its company. The idea then was that the Volunteer was to be one who not only sacrificed part of his spare time, and of the enjoyments of home and social life, to prepare for the defence of his country; but that he should find the money to clothe and equip himself, and pay out of his own pocket for the weapon served out to him, and the ammunition to be used with it. In short, while saving the country from compulsory military service by willingly undertaking duty for others, he was to be permitted to do the duty—to quote the words long familiar to me by constant reiteration, when I was allowed from time to time to go to Aldershot for special training—"This permission is given upon the distinct understanding that his doing so is not to involve any charge upon the public service."

Such a state of things was probably unique in the history of the world, that a general call should be made upon the patriotism of the nation, and that those who responded should be required to find for themselves the things needful for the fulfilment of the service, and those who did not respond should go scot-free; that the worker should be taxed, and the drone left with his money in his pocket, to spend on his pleasures. There is no other nation in Europe in which the official mind, and the public mind, could, or would, expect success for such a scheme. The result was that at first the enrolments were chiefly among the well-to-do classes—lawyers, bankers, merchants, civil servants, and, in the country, squires, farmers and tradesmen. But the artisan was not going to be excluded. The working men came

forward in large numbers, and made, what for them, were greater sacrifices than those made by the middle and upper classes. Let me give an illustration from my own experience. I remember well the first four companies of artisans being enrolled in my own city of Edinburgh. It was the converse of the taking of the Queen's shilling, and a pretty handsome converse, too. Every man asking to have his offer of service entertained had to bind himself to pay £1 10s., of which 10s. were required to be put down before he could be sworn in. Notwithstanding this, in the course of a year, the number of artisan Volunteers increased so greatly that the corps ran up from 8 companies to 16, then to 18, and ultimately to 25, of which at least two-thirds consisted of working men or men whose means were as meagre as those of the artisan. The remainder of the money necessary had to be sought for by expedients—bazaars and fancy fairs, theatricals and subscriptions extracted by dunning the charitable, etc., etc. Again I say that such a mode of keeping down the estimates for the expenses of the public service would have been impossible in any other nation but this. When such sacrifices were made all over the country, it was a testimony at the time that these men were in earnest, and if the Force gradually rose to the 250,000 which we are now told is too many, it was the fruit of that first self-denial by which alone the Force in its early days obtained the stability of perseverance which finds it within sight of its jubilee, numbering a quarter of a million of men—men who, whatever may be said about their physique or their training, are a living symbol of the spontaneous patriotism of the race, which in others who do nothing for the national defence is, we shall hope, only dormant, and will wake into life, should the day of peril come. For, although we detest militarism, we are a martial race by nature.

The Force has come through many phases, and has survived them all. It had its "spoiled child" phase, when it was petted and flattered, probably the most dangerous to its welfare of all through which it has passed. Then came the time of reaction, when the upper and middle classes had ceased to crowd into the ranks, and when with few exceptions it was left to the working men to fill the places which the well-to-do had vacated. It was then that it began to dawn upon the official mind that a state of things could not continue in which a Force consisting mainly of poor men and young officers—the great majority of both just entering the battle of civil life,—should not only give up their time and much of their legitimate family comfort and social enjoyment to serve gratuitously for the rest of the community, but should be heavy losers in purse for doing so. The burden, particularly upon the officers, was becoming intolerable, the Force having been allowed to fight its own way for several years, the only expense to the State being the providing of inspecting officers and adjutants. Uniforms were beginning to become unserviceable, and had to be replaced; the expenses of headquarters and ranges were great, and the general public, who, in the person of their generous members, had contributed largely in the first instance, could not be called upon again to do, as individuals in unreasonable measure, what, if the Force was worth maintaining at all, was plainly a national duty. The public generally had ceased to take any real interest in the movement, and indeed in many cases employers and parents discouraged young men from entering

the Force. The men of position who at first had taken commissions to encourage others had gradually disappeared, many of them being quite unfit for practical military command, and it had fallen to younger and poorer men to take up the duty. Up to that time many officers did the whole drill and musketry work of their companies, without any Army instructors' assistance, and did it well, qualifying themselves by diligent study, and sacrificing many a social pleasure to devote their evenings to drill, and their half-holidays to musketry. If the records of those days were to be turned up it would astonish many to know what earnest and full-hearted work was done. I have often myself attended three drills a day, two learning with other companies and the third drilling my own, and the old roll-book of my company recorded many attendances of the men at 70 to 100 drills in the season from November to July. Of course, at that time the Volunteer was very seldom taken seriously, either by the Army or by a great proportion of the civilians; indeed, there was not only "damning with faint praise," but many a sneer to be endured. Every defect in the individual was pointed at as characteristic of the whole. A drunken or disorderly soldier—well, he was an exceptional disgrace to his corps. A drunken Volunteer was held typical of the mass—he was a proof that the whole force was undisciplined and useless. If an Army colonel clubbed his battalion, or his captains bungled a deployment, it was a mistake, and that was all. If such a thing occurred in a Volunteer Corps, military shoulders went up and the crowd jeered. I remember well on one occasion of a sham-fight at English manœuvres hearing a C.O. of a Volunteer battalion roundly abused by a staff officer for bungling, and the contemptuous phrase, "These Volunteers," flung at the corps, then and now one of the best in the Service, and I, being on the occasion only a spectator, with difficulty restrained myself from informing the speaker that the Volunteer he was expressing his contempt for had only two years before left one of the battalions of Her Majesty's Foot Guards with the rank of a field officer, and that his inefficiency was a cause of chagrin to "These Volunteers" who served under him.

There can be no doubt that this was the most critical period of the history of the Force. It was the time when conditions began to be prescribed to the Service. If a capitation grant was to be given, a test of efficiency was to be exacted as a *quid pro quo*. The nation undertook to meet the reasonable cost involved, if the Volunteer undertook to give a definite amount of work. This was at once accepted. Instead of exaction causing a falling off, the numbers increased, and the 105,000 of 1860 became the 250,000 of to-day. The Volunteer Force gradually took its place as no longer an experimental but as an integral part of the Forces of the Crown, and was gradually drawn into closer relations with the Army. And I have no hesitation in making the assertion that it is those officers of the Army who have been thrown most in contact with the Volunteer Force, who have the best opinion of its potentialities, and who took it "seriously," although it seems to have been thought in Pall Mall that it had never been taken seriously till the 24th December, 1901. Of course, all recognise that the Volunteers are but rough-hewn material, and that a large proportion would require some time for extra training before they could be considered able to take their places in the front. But those who

discriminate see nothing in this to the discredit of the Volunteer. It cannot be otherwise. It is in military matters what it is in all other branches of skilled athletics and marksmanship. The best individual amateur may be nearly as good, or even as good, as a professional; but the general body of amateurs cannot be up to the standard of the professionals as a class. Therefore, comparisons between them which are made by weighing them according to one standard are unphilosophical and stupid. The question is not whether Volunteers can compare with Regulars. The question is whether the nation gets out of the Volunteers all that it can reasonably expect from a Force which must be trained in hours taken from spare time, that others devote to family life and personal enjoyment, and which makes no gain by its service. If it does not, and cannot, then there is no question as to what should be done. The curtain should be rung down, and the farce, played under the stage management of Cabinet Ministers and Commanders-in-Chief for nearly 50 years, brought to an end.

The nation and its advisers should face the question as one new and crucial—what is to be done to make provision for the national defence? If the Volunteer Force is a make-believe, although flourished by authority before the nation as a reality during all these years, the sooner it is out of the way the better, that the question of the national defence may be looked fair and square in the face. It is easy for Royal and Departmental Commissions or Committees to make reports and recommendations for compulsory training of the manhood of the nation, but it is quite a different thing for the Government or the country to entertain such an idea. We citizens know perfectly well that no such thing is intended to be done, or will be done, as to bring a Bill into Parliament to enforce compulsory military service on the community. We are a long way from that yet. The Volunteer may be good for little, but he is good enough to be put forward as a stop-gap, a means of preventing disagreeable and awkward subjects from being thrust before a Cabinet, and a solution of them demanded. The true problem is how the issue of straw may be kept down to please the Treasury, and soothe the taxpayer, while the tale of bricks which the Volunteer is called on to deliver is made more exacting and burdensome. The present question is—how near can the Volunteer be brought to the region of compulsion, without reaching the breaking-strain point?

What is the present state of matters as regards the Volunteer Force? Is it true or is it not, that it has progressed in efficiency for many years, that the proportion of officers who have qualified in those military subjects which are appropriate to such a Force, has largely increased, that during the recent war it—to the surprise of the military world—contributed all it was asked to contribute for active service quite outside of its engagement, and at common soldier's pay, that its own officers were found able to lead their companies with credit, and to maintain discipline, that it contributed many officers and many men to new corps, formed for the occasion, and that these acquitted themselves to the reasonable satisfaction of those in high command? I speak from what I know as regards my own brigade, and will appeal to the expressed opinion of the commanding officer of the Royal Scots as to the service companies sent out to him; and I have yet to learn that any general in the field has had

to send in an unfavourable report against the English or Scottish Volunteer, either as regards efficiency or discipline. On the contrary I feel justified in trusting much to the words of so high an authority as General Sir Thomas Kelly-Kenny, when he said:—

"The Volunteers joined their Line battalions with extraordinary quickness, assimilated all that was good in our regimental system, and contributed to it with their many fine qualities. They were intelligent and patriotic, and fell into disciplinary order at once. I found them throughout the area of the campaign, held in universal approval by the generals, brigadiers, and commanding officers, under whom they served, who frequently, by reason of their high training, their intelligence, and their physique, and their marksmanship, placed them in advanced positions, demanding special individuality."

Speaking again of what I know personally, I am ready to take the deliverance of any of the seven or eight generals under whom I have done training at Aldershot for many years, whether in work done, and discipline exhibited, the Forth Brigade, who went there in large numbers, fell short of any standard which it was possible for a Volunteer Force to attain to. Of course, there were deficiencies, and there almost always must be deficiencies in troops intermittently trained, and often necessarily ignorant of many of the minute points which, in a Regular Force, are held to be the symbols of discipline, though often but poor exponents of discipline itself, which is a moral and not an external condition. But it is a complete delusion to suppose that the Volunteer objects to the exercise of firm discipline from officers who know their work. My experience is, and I know that it is the experience of all who have been long associated with the Force, that the company in which work is vigorous, and discipline firm, is the company that has recruits pressing into it, and that the units which fall away are those where the officer is, by nature or by ignorance, incapable of infusing the spirit of discipline. There is nothing the Volunteer in the ranks detests more than being made a fool of by his not being brought up to a proper mark in soldierly drill and discipline. If his officer can do it, he will submit to anything at his hands. It is its absence which brings about resignations, or deadens recruiting.

No one who has had long experience in the Volunteer Service can doubt that the question of maintaining a full cadre of efficient officers is the all-important one. The material of the rank and file is better on the average than is obtained by the Army recruiting sergeant, for which opinion I refer to the official statements of Lord Wolseley, Sir Evelyn Wood, and Sir John French, and many others well able to form an opinion. It is material that can be made good without difficulty, if the command, from the officer at the head down to the subaltern, is what it should be. And by that I do not mean that every officer must necessarily be what in a polite society sense is called a gentleman, which is a term often much misapplied. If a Volunteer officer has the instincts and the manners of a gentleman, although his station may not be such as would admit him to exclusive circles, he may be, and often is, a better officer than the man who, with a natural right by birth to call himself a gentleman, has never had to brace himself to a true life of usefulness. In my long experience I have never known one case of a man who had at no time any steady occupation in life making a really good Volunteer officer. I know there are such cases, but they are very rare. It is

your idle man who never can find time to do anything, and no truer word was ever spoken than that of Colonel Westropp before the Royal Commission, "The busiest civilian is the best officer." The most efficient officers I have ever had under me were men who had much to do in civil life, and among these were many who, joining young, practically made their position as gentlemen by taking on an officer-like bearing, and finding satisfaction in the study of smartness of person and conduct. The private in the Volunteer ranks will never care who the father of his officer is or was, or what he is doing in civil life, if he knows the officer to act like a gentleman, and finds himself and his comrades to be smartened by his command and stimulated by his example. That such men can be found to command Volunteers, and command them well, I know by experience. They may be of little account in what is called *haut ton*, but they, though poor in money, and unrecognised in station, are gentlemen in the best sense. In my old corps, with its cadre of over 100 officers, I have never known a year in which there was more than an odd one or two vacancies, and often there would be several candidates waiting for commissions: and this without keeping up numbers fictitiously by allowing any officer to hold a commission for which he was proving himself unfit, or nominating officers for commissions whose education and manners were exceptionable. Many a man had to get a hint to go, as must be the case in all corps that have any true standard of efficiency, for nothing will do more to prevent young men joining as officers than the knowledge that men are in the commissioned ranks who will be above them, the state of whose commands shows decay and failure.

But it is certainly a deplorable feature of our modern national life that in a country, the most wealthy in Europe, where so many young men have no need to work for their living, and where there would be an excellent field for their energies in a patriotic service for national defence, it is the rarest thing possible to find one who will make a small sacrifice for so good an end. How many well-dressed and perfectly groomed triflers are there in this great London with brains atrophied by society small-talk and frames enervated by idle habits, who, if they could be roused to a sense of duty, are capable of excellent service. It is all very well for Royal Commissions and lecturers and writers in magazines to keep harping on the theme that the Force should be officered by gentlemen, meaning thereby gentlemen born. It would be much more to the point if they would tell us how it is to be done. This sort of talk which is fired off at the Volunteer officer who *is*, and made a matter of comment against the Force,—making the idleness of the absent a reproach to the active and the devoted,—reminds one of the clergyman who, having a very small congregation assembled, roundly rates those who are present for the sinfulness of those who absent themselves.

This has been rather a digression, but it is surely a duty, whenever an opportunity arises for speaking on the present topic, to raise one's voice in urgent entreaty to our idle young men, who, instead of using sport as a recreation, devote their lives to it as a business making it a canker to their true energies, if by any means they can have the spark of patriotism made to spring up in their hearts, kindling them with the fire of a new affection, causing them to give a small modicum of the time that they alone in the community have at their free command, to a generous service for the country's safety.

What a difference it would make, and if they knew it what a real benefit to themselves, and with almost absolute certainty a welcome relief from the blasé state of the votary of mere self-indulgence. Alas! "Pleasure," as a dominating influence, as our great bard says, is of those spirits which:—

> " . . . have ears more deaf than adders to the voice
> Of any true decision."

But to return to the general question. The Jubilee of the Volunteer Force is approaching, and in this year 1905 no one can tell what its future is to be. The only thing that seems certain is that a determined effort is to be made to cut down its strength by 50,000 men; till a few weeks ago we heard it was to be 80,000. For what good purpose this is to be done, it is very difficult to see. At a time when it has been made manifest in South Africa, and is being made still more manifest in the Far East, that war to-day means the assembling of enormous forces, which are to the armies of Napoleon and Wellington as an elephant to a rat, the greatest effort of Statesmanship and of Army Administration for the better defence of the country is to reduce a quarter of a million of men voluntarily enlisted to 200,000. The pretence is of course that there is to be some wonderful scheme by which the 200,000 are to be much better than they were before, although how they are to be better no one knows. For it is quite certain that the scheme originally propounded for forcing Volunteers to do compulsory continuous training in camp, whether it was consistent with possibility or not in view of their civil obligations, has fallen through, and will only be mooted again by the tinkers of Pall Mall in some modified form, which will take the compulsory element out of it. To order Volunteers to compulsory duty for a fortnight in time of peace is quite inconsistent with the very basis of their service. It would subject employers of labour who allow their men to join the Force to a severe and exceptional tax. It would cause thousands of men to be compelled to make their choice between resigning and losing their employment. It was a proposal quite inconsistent with reason. A Volunteer must of course submit to certain conditions for efficiency, but the time of year or the time of day at which the prescribed work shall be done must in all reason be left to his own commanding officer, and not dictated by an ill-informed and system-bound Department. The C.O. must be left to order his drills, and regulate his musketry and all other duties, in consistence with the fact that the Volunteer is a person whose first obligations are those of civil life, and whose duties as a Volunteer must be adjusted so that his livelihood and his contract obligations to others shall be safeguarded. And the suitable will necessarily be different in different corps and in different localities. Surely if a man's services are accepted upon the footing that he is sacrificing of his leisure time, you are doing him a wrong if you demand of him that he shall give up the duties he has undertaken and break his contracts to serve you at times which you prescribe. I speak of course of peace time, when he has not been called to actual service, but is in the position of his first obligation being to his civil duties and to his family. And still less reasonable would it be in the case of the professional man who has a going business, and who cannot, as a workman can do, leave his work for a time with reasonable confidence that he will obtain other employment when he returns. What was

the consequence of the promulgation of this extraordinary idea of dictating a fixed period of continuous service to the Force in the startling Order in Council? The professed aim of proposed reform being to get a better class of men, the immediate effect of the Order was to deplete those corps which mainly consisted of men of a better class, and which in the Metropolis had for five and forty years cheerfully given more service than the Regulations exacted. Let me give you a few figures. There are perhaps no corps in the kingdom more representative of middle-class life than the four I name:—

The London Scottish.
The London Irish.
The Queen's Westminster.
The Artists.

These corps, at the time when the new scheme of compulsion was mooted, numbered respectively 1,100, 1,382, 2,000, 1,100—in all 5,582. No sooner were they made to understand that there was an intention of exacting duty from them as a condition of service at a time and place and for a duration fixed by authority, whether their civil engagements would be interfered with or not, and that the alternative was financial ruin, than these numbers fell to 550, 660, 1,000, 500, or a net loss at one fell swoop of 2,872 of the flower of the Volunteer Force—men of higher intelligence and education, and finer physique than most of the urban corps of the country. I cannot doubt that our rulers at Pall Mall, if they made any enquiry, before they made their announcement, were well informed by those who could speak from knowledge of what its consequences would be; but they always know better. They never realise that the Volunteer not only may, but must, judge for himself as an individual whether he can or will continue his service under conditions dictated to him.

But then it is said, we consider this to be necessary for efficiency, and therefore we must insist upon it. Good. The Volunteer admits that authority is entitled to formulate its demands; but it is vain to call him unpatriotic and to denounce him as a bad citizen if he announces that the conditions are such that he cannot undertake to fulfil them. He is doing voluntarily and without any return for it what is no more his duty than that of every able-bodied citizen. When conditions are prescribed to him he is surely entitled in the exercise of his liberty to consider whether he will volunteer or continue to volunteer on such conditions. Time and time again has the Volunteer given up his only week's holiday in the year, *teneræ conjugis immemor* in many a case, to submit to training. If he says, "I cannot give a fortnight at the prescribed time of the year without an undue strain on my family relations, and it may be with a loss of my employment," in what sense is he acting unpatriotically? Surely the patriotic man is the man who gives what he can, at those times when he can, and the unpatriotic man is the man who gives nothing. If those who give what they can are not worth having on that footing, then I say again, disband them and face the situation. If you are not prepared to do that, then you must take what service the Volunteer can give you, as regards day and hour, of which he is and must be the judge, whether the War Minister and his advisers like it or not. It is his own local commanding officer who must judge of the when and the where the prescribed quantity of training can be given. Without

reasonable elasticity the working out of a Volunteer system is impossible. Rigidity must result in collapse.

But then the cry is that the Volunteer is too poorly trained to be of any use. It is rather amusing. One Cabinet Minister says this with emphasis, and another proclaims the "Rifle Club," without any military training at all, to be the hope of the country. "If once," he said, "you impress upon him"—the citizen—"that the defence of the country is not the business of the War Office or of the Government, but the business of the people themselves, *learning in their own parishes the practice and accomplishments which will make them formidable in the field*, you will then have a defensive force which will not only repel the assailant if he comes, but will make the chances of that assailant so bad, that no assailant will ever appear." And a Minister in the War Office Department announces that the Government looked upon Rifle Clubs as the best material out of which to form an Army if emergency should arise.

Thus, on the one hand, those who have been training to serve the country, are told that although they have drill training and regular musketry regulation instruction, unless they go into large military camps for considerable periods, and at times prescribed and forced on them, they cannot be of any use; and, on the other hand, we are told to rely upon the people acting independently of Pall Mall, and His Majesty's Ministers, and learning what is needed for the national defence "in their own parishes." A defensive Force is to be begun to be formed out of "Rifle Clubs" after emergency, and not before it. What a splendid Bab Ballad W. S. Gilbert could turn out, without in any particular misquoting these deliverances, of our great ones. In order to encourage the people to devote themselves to the country's defence, those who have already done so are to be insulted by an order for disbandment to the extent of 80,000, now brought down to 50,000 men, for no conceivable purpose that can be suggested, except to cut down the estimates by £350,000. One would like to know what will be the feelings of the population towards devoting themselves to "learning in their own parishes the practice and accomplishments which will make them formidable in the field," when they see that those of their young men who have done so in the only way in which they have been asked to do it, are to be subjected to the insult of being stripped of their uniforms, and made to send their rifles into store to go back to the Government armoury, upon the footing that all they have been taught by Army adjutants and instructors is of no use. They are not likely to be soothed by the statement that in emergency they can get back to service through a parish organisation, by the people carrying out what is their business and not that of the War Office or the Government. Of course, it will be said that the 50,000 will be selected from the least efficient, from corps and companies that are feeble in strength. This is the scolding clergyman over again. Those, who in spite of lethargy around them, have held to their posts and done their best not to let the Service fail in their district, are to be rated as useless fellows, and sent to the right about, because others stood by idle. The men who have made sacrifices and stuck to their work in adversity are to be dismissed to carry into their little circle a bitter feeling of resentment, which will rankle long, and make the service of the country to be a thing which is known as bringing with it the sting of contempt. But worse than this; it is in outlying places, the

thinly populated districts, that most of these supposed weak lambs for the slaughter will be found. And it is just there that the strongest bodied, hardened, and sound men are found, the very men most wanted when endurance of body is called for—the first and most important element in the foot soldiers' suitability for service, and who ought to be kept together, although it be in small numbers, and with a modicum of drill. And these men, the very best material for a country's defence that can be found, you are going to thrust out of your Volunteer defensive service, because they, with their limited opportunities, cannot learn everything, while the rest, who have never done any service, are told that parish rifle clubs will be so mighty a defence that they will frighten an enemy from off our shores. A more fatuous policy for cheeseparing saving was never perpetrated in the history of a nation. Surely something more consistent and sensible might be expected on such an all-important subject as national defence.

But then it is said that they are not needed, that 200,000 is quite a sufficient number for the defence of the country. It is hard to believe that such a statement can be the result of any but the most surface reasoning. If it means that what is left of 200,000 men, after they have been depleted by the great losses which have now to be faced in modern war, and which, in the case of a death struggle to prevent a successful effort at destruction of our national power, would not be small, then I take leave to say that there is no man in Pall Mall who could work out a calculation such as that which would be worth serious consideration for one moment. If, apart from so great an issue as national existence, it means that 200,000 Volunteers are sufficient to deter any foreign foe from attempting to land a powerful raiding force on our shores, then the Volunteers would consider the view to be highly complimentary to them, but scarcely consistent with the report of a recent Commission. The logic would be rather funny which said "we have a Force of 250,000 Volunteers, but neither their musketry nor the tactical training of the rank and file would enable it to face, with prospect of success, the troops of a Continental Army," and therefore now, when that is its condition, we will diminish its strength by 50,000 men, as 200,000 such men are quite sufficient for defensive purposes, and will leave it to the future to show whether in our 200,000 retained we have a Force that can be trusted for the national defence. Since the days of Hushai the Archite—who, by the way, spoke to mislead the Government *in esse*, and not to aid it—no more preposterous position was ever taken up by the military advisers of a nation. The authorities are making believe—either consciously or unconsciously,—they may take their choice of imputations,—towards the development of an efficient national defence, of which a restricted number of Volunteers are to form part. What apparently they propose to do is to make a show before the eye of the public, by introducing far-reaching alterations, cutting down this cadre by so many men, and ordering those that are left to do more, whether they can do it, or are willing to do it, or not, and flourishing before Parliament and the country the trite maxim that it is better to have a smaller force of thoroughly efficient troops than a large Force which is less efficient. Thus they excuse the squeezing out of the Volunteer Service of one-fifth of its present strength, while they ask that it be assumed that attenuated numbers must bring about greater efficiency in those that are left, without there being the slightest ground for so believing, and in

direct contradiction of the advice of those who are in the most intimate touch with the Volunteer, as the denizens of Pall Mall have never been, a few honourable individual cases excepted. The "what ought to be" is made a sufficient ground for drastic changes, when a sound discretion would lead to the consideration of "what can be," as the first question for solution, and whether assuming things to remain as they are, it is possible to say that more "can be" than now is. It is futile to take action to change "what is," until it is certain that the change is practical and practicable, and will bring "what is" nearer to "what should be." What those who now enter the Volunteer Force seek to know is, whether their services are desired at all, as citizens who are willing to make some sacrifices which others will not make—sacrifices of time and labour, and of social and family life, at the nation's call? Are their services desired because they are looked upon as real services, for which the nation should be grateful? Or are we to understand that we have been accepted to form a sort of buckram army, stuffed figures on a hill-side, to hoodwink an ignorant public, without hope of deceiving the Secret Services of other nations? Are the Volunteers to stand between the Government of the day, whatever it may be, and the problem of how to get out of the Treasury what is needed to constitute a real national defence Force, with the certainty that whenever they propose the necessary expenditure, they will be turned out of office for burdening the tax-payer with the cost of "bloated armaments," the usual clap-trap which makes rulers afraid, and leads them into the bye-lanes of temporary party expediency.

The question may be put in a very telling way by an illustration. If all the Volunteers in the country were to exercise their undoubted peace-time right upon the 1st day of next month, and to send in their resignations, which would take effect on the 14th of that month, what a howl of indignation at their unpatriotic conduct would go up from those millions who have never shown a trace of national defence patriotism at all. But the situation would then have to be faced. If this happened, does anyone suppose that the public would be put off by any War Minister or any Committee of Defence, telling them to keep their minds easy? Does anyone suppose for a moment that the steps which would be held to be necessary, and would be demanded from the Government, to put the country into a state of defence, would not cost ten times as much as is now expended to meet the outlay connected with the Volunteer Force as it exists? And no doubt by paying for it they would get something better. But they would not only have to pay for it, that would be their least difficulty. They could only get it by compulsion. Enforced service would become a necessity. Now, the Volunteer has a right to ask what is the view that is taken of him by those who now make use of him—to ask whether he is looked upon as a convenient make-believe, a paper Army to flourish before our own and other nations, deceiving ourselves and deceiving nobody else, lulling the public into a false sense of the security of the national stronghold, and fending off conscription with all its distasteful aspects to the possible conscript, and its certain unpopularity with the tax-paying citizen. If the War Office, after another Commission or two, will only come to a definite conclusion and frankly express it, they need have no fear that any Volunteer will resent a decision that some more efficient means shall be provided for national defence than the Force

can give. If no Volunteers, and a congeries of independent Parish Rifle Clubs is a better provision for national defence than what we have at present, tell us so, and we will cheerfully withdraw from a false position. I have been associated closely with the Volunteer Service for five and forty years, and I know that the feeling of all good Volunteers has always been, and has been often expressed, that if their existence was to be held as an excuse for weakening or starving the Regular Army of the Crown, they would at once leave a Force whose existence was being, in the supposed case, exploited for the illegitimate purpose of flourishing before an ignorant public economical budgets for party and therefore for unpatriotic ends. They would unhesitatingly support the view which the late Duke of Cambridge, when Commander-in-Chief, expressed with emphasis:— "That any step taken as regarded the Volunteer Force, which might lead to a reduction of the Army, would be disastrous."

And this leads me to say that when we Volunteers are told that we are not properly trained and equipped for service, we would most heartily rejoice if it were easy to believe that it could be truthfully said that our part of the Forces was the only one of which the statement could be made. Have we not seen very strong indications of late years that there is much to find fault with in the training of our Regular Forces? Admitted that in mere drill, the externals of military training, they may be able to exhibit that greater "steadiness on parade" which, though undoubtedly a part of military fitness, is only a part, and by itself but a subordinate part of military efficiency. That is, I know, a frightful heresy, and I admit it would be, if the be-all and the end-all of military training were a good march-past. But I think we have outlived the belief that close work, after the pattern of the days of the Duke of Marlborough and Prince Eugene, is still the talisman of military success. We have had lately a struggle with an enemy to whom the march-past was as strange as integral calculus, and in which we did not always show to advantage. I for one can only think and believe that the defeats and surrenders of the first six months of the South African campaign were not the result of our Regular officers and men being trained in such a way as to fit them for war under modern conditions. Either the system was bad or the training under the system was bad, or the officers and men were bad. The ordinary citizen, who knows his fellow-countrymen, believes and will continue to believe that it was not the material that was at fault, but the failure so to handle the material in peace time as that it should be at all times ready for war under modern conditions. Then again, the marksmanship of the Volunteer is criticised. Well, it is not so many years ago that in the Lecture Hall of this Institution I heard the opinion of the shooting of the Regular soldier from so good a representative of the real military man, viz., Sir Henry Brackenbury. Here are his words, spoken after his return from the Soudan expedition for the relief of General Gordon. After giving the highest praise to the general qualities of the British Infantry soldier, he said:—

> "But there is one thing, Sir, I regret to say, and that is, that they cannot shoot. Nothing struck me more, perhaps, after our little fight at Kirbekan, than to see the whole faces of rocks, as big as the side of this room, spattered with bullet marks, that could not possibly or conceivably

have gone within 20 feet, 30 feet, or 40 feet of anyone at whom they could have been aimed."

I quote this only to show that when people imagine that it is only among Volunteers that there are serious deficiencies in fitness for service, there is another side to the picture.

And as regards *matériel* of war, how do we stand? The Department which is responsible for the national defence on land is found to have been for years behind the world in the artillery arm, and we have nothing between us and a foreign foe but the promise that we shall in course of time have guns that can hold their own against our enemies, if they will only give us a few years to get them; while as regards the small arm, we are once more engaged in listening to a Babel of experts, condemning, or at least accusing, one another.

One thing is certain, that if history repeats itself, it will be a long time before our Royal Artillery have the guns they ought to have. For how many years did the Government mock the Volunteer Artillery by sending them season after season to pretend to be preparing for national defence by shooting with old cast-iron smooth-bore guns, about as efficient for the war of to-day as those which lie outside the door of this Institution.

Lastly, we are told that there is great deficiency in transport power in the Volunteer Force. The reason is obvious. You can get men and take work out of them at very little cost if they get no pay; but when it comes to beasts and vehicles for them to draw, it means a good round sum down. One would like to know whether the War Department is satisfied with what is doled out to it by the Treasury for the Regular Army. Does anyone believe that the Division—or is it Army Corps?—at Aldershot could at a week's notice move out in thorough war equipment for the road? Of course, we know it could not.

From all this it would appear to the ordinary mind that our War Minister has enough on hand in the work of getting the Regular Army into an efficient state as an instrument of war in its training, its *matériel*, and its transport. The country will desire to see our regular land forces brought into a state of efficiency which will compare with that of our sea force before it will have any confidence at all in the powers of our War Department to provide it with a really efficient home defence. In the meantime, it is worth considering whether there is wisdom—or not rather folly—in discouraging in any corps or in any place the development of such military efficiency as can be obtained in reason from any man of sound body and mind who offers to submit himself to training and discipline, so far as is consistent with his primary duties in life. Will any sensible man deny that a number of rough-hewn blocks are nearer the finished article than the stone lying untouched in a quarry-face? And when it comes to war, then the old saying that "time is money" has its truth demonstrated in the bleeding of treasuries and the welling away of a nation's life. In such a case a depleting of the Volunteer Force by 50,000 men to save two or three hundred thousand pounds may cause an expenditure of millions and an unnecessary loss of thousands of lives, even if your military operations are ultimately successful. It has been so and will continue to be so whenever the nation is face to face with the exigencies of a great struggle for existence, until the question of national defence is tackled in a practical manner.

We who so think may have little hope that Ministers and Defence Committees can be brought to look at matters from our point of view, but feel that our testimony must be spoken now, "whether they will hear or whether they will forbear."

Colonel HUGH PEARSE, D.S.O. (late Commanding 2nd Battalion East Surrey Regiment):—Lord Kingsburgh quoted several officers, chiefly commanding divisions in South Africa, as to the value of the Volunteer Service Companies, and they all naturally spoke most highly of them, and I think perhaps possibly a word or two from me might be acceptable, as I had the honour of commanding a battalion in which one of these Volunteer Service Companies served. The company which came to my battalion was an extremely fine one in physique. It was also very well trained and well officered. It did not fail in any particular. But what I desire to say is that its great merit was something that has not been mentioned by the lecturer, namely, the most important quality that any soldier can have, whether he is a Regular, or a Militiaman, or a Volunteer, and that is, great earnestness and patriotism; and the men I had showed that quality very prominently. Every one of them had sacrificed a good deal to come out, and they did all they were asked to do. They were only asked to serve a certain time, at the end of which they went home. Their one anxiety was to have some casualties in the company. That was a spirit which cannot be too highly commended; it is the spirit which has enabled the Japanese to do the wonders they have done in the present war. Although it does not become an officer on the active list to discuss the desirability of any step taken by the War Office with regard to reduction or non-reduction of any part of the National Forces, I should like to add my humble testimony to the great value of the patriotic spirit of the Volunteers; and I think everyone will agree that if you have a good body of men with that spirit you cannot have too many of them. Nothing but financial considerations would suggest for a moment that the numbers should be reduced. There is one point in which I believe the Volunteers could be improved as regards their fitness for war, and that is not a matter that solely affects themselves, but one that affects the nation—the want of gymnastic training when boys. I believe that if every boy in this country received a gymnastic training—not necessarily a very exacting one—while at school, which is the best period for such training, he would learn his drill very much more easily, and he would be more fit to endure hardships on active service.

Colonel H. BETHUNE PATTON, C.B. (Brigadier-General Commanding Gloucester and Somerset Brigade):—Throughout a long service in the Auxiliary Forces, dating from the year 1861, when I left the Army, it has struck me on many occasions that just before the Army and Navy Estimates there has been always more or less an attack made on the Volunteer Forces. Over and over again, just at that particular time, it has been said that there is little or no fear of invasion; and I imagine that is the sole reason why we Volunteers exist in the country—that is to say, to be ready to repel an invasion. They have carried this to such an extent that the whole British public were told the other day, through the Press, that it was impossible even for a dinghy, containing five men, to land in this country. If that is the case, what is the use of maintaining even 200,000 men to repel that wonderful dinghy with its five men in the event of its endeavouring to land? I think we might very safely leave the repelling of such a force to the Village Rifle Clubs. There was an

illustration in the late manœuvres in Essex. Unfortunately it was one of the few manœuvres during the last 30 years that I have missed seeing. I could not be present; but I was told it was a beautiful sight to see transport after transport drawn up in the most precise manner, escorted by stately ironclads, flanking and protecting the landing; and that during the time it took to land these picked troops from those transports, had they really been an enemy, before morning there would have been nothing seen, not even a ripple on the surface of the water where these magnificent ironclads and the transports they escorted lay. Why? Because we had torpedo-boats on either flank lying in adjacent harbours, and under the cover of the night they would have pounced upon ironclads and transports alike, and before morning they would have been all sent to the bottom, and there would not have been a single vestige of either transports or ironclads to be seen. That is a very pretty story, good enough for a picture-book; it ought to have been illustrated in a "penny dreadful." I do not think that foreign admirals are quite so accommodating as to come over here and allow their ironclads to lie off our shores like ducks with their heads under their wings, and be pounced upon by torpedo-boats and sent to the bottom without firing a shot. I do not think such a thing is at all likely. The experts—the men supposed to have the best opinion as to what is likely to take place—express the view that invasion is impossible; but it is possible that a raid of three thousand men might be made upon our shores. With regard to the three thousand men, I have the same opinion as I had with regard to the crew of the dinghy. Why is it necessary to keep up 200,000 Volunteers to repel a raid of three thousand men? God bless my soul, we should not want any ammunition; our bayonets on a dark night would be quite sufficient to give them a swimming lesson, and they would be off as soon as they came. With your permission, Sir, I will give you my version of how an invasion might take place. A war with two or more powerful nations combined, with efficient Navies, might take place, and as soon as that war occurs just imagine what will be the demands upon the British Navy. No man living has greater admiration for the Navy than I have; but just think of what it would have to do. The Navy would have to escort our Regular troops, form strong escorts to take them to the country wherever they happened to be required. The stereotyped place is the North-west Frontier of India. Another thing they have to do is to guard our food supply. I am one of those who think the food supply of this country in a war between two or three foreign Powers would be much more serious than this country is inclined to believe. I think if the starving multitudes, out of work, could not get food except at exorbitant prices, there would be very probably a revolution in this country. A third demand on the Navy would be to fight battles, squadron to squadron. Then, in addition to defeating the big squadrons of the enemy, they have to encounter those deadly enemies the submarines, torpedoes and mine-fields. Then, when our Regular Army had all gone abroad, as it did in the South African War, followed by our Militia, of whom I have a very high opinion, would be the chance of the enemy. I have never served in the Militia, but I have seen the Militia at manœuvres, wet through to the skin, coming along whistling, with their heads up, and I have come to the conclusion that if only those men are taken care of, well officered, and done justice to, the country may rely upon it that it can easily be made a magnificent Force, and one that would create a very fine second Line for the Regular Army. This of course is provided they are treated properly. I will not take up your time by alluding to what I consider is the proper treat-

ment. Now, when the Army has gone and the Militia has followed them, we should be very likely, according to our present organisation, to be left in a sad plight. We should be left without any guns, as we were during the South African War. There is a very distinguished officer present at this meeting—I will not mention his name—who asked me in my tent on Salisbury Plain in 1900: "How many batteries of artillery do you think we have now left in the country?" I had then 8,000 Volunteers under my command within a month. I said: "I have not the least idea." The distinguished colonel said: "There are six batteries of artillery only in all Great Britain." If things are going on the same now as they did then, the invasion I have spoken of might be a far more successful business, and instead of a raid of three thousand men, we might have an invasion of 100,000 men or more, and then it would become a question of what would happen supposing the country chooses to allow the Volunteers to be left without organisation. Now, what is to be done to prevent that? I think the remedy is very simple. Treat the Volunteer Force *as a separate and independent Army for home defence*, and for home defence only. Let us send contingents abroad by all means if we get the chance—as provisional brigades, as I suggested for South Africa—and I daresay we should send a lot in the event of war; let the Home Defence Army be organised in mobile columns—easily concentrated, forming the arc of a circle round the invaders by rail. Let us have everything all ready: mobile columns of about 10,000 men of all arms, commanded, if possible, by Volunteer officers themselves, and, if impossible, by ex-Regulars, who will remain with the Volunteers and with their Staff, and that will ensure that we shall not be left like babes in the wood, without the officers of the Regular Army commanding us as soon as the war breaks out. Naturally, every good officer's service would be required abroad; but we can still have those officers who have had a thorough training with the Regular Army, and to my certain knowledge many excellent Volunteer officers. There is only one more thing I will allude to. In the event of a war such as I have mentioned we should secure the services of a Volunteer Reserve. I know something about the Volunteer Reserve. Years ago I got 600 men formerly of the battalion I commanded to sign a certificate to the effect that they would come up in the event of war, and without any pay they would do three drills a year or more, and that they would fire so many rounds at the range. Amongst those 600 men the smallest man was 5 feet 8 inches, and the tallest 6 feet 7 inches; I never saw finer men in my life. I maintain if this country would only entertain the idea that the Volunteers should be treated *as an Army*, it would be a great success, and *any amount of officers would be proud to belong to it*. If it is to be a success let them have a Reserve behind the Volunteers of 100,000 or 150,000 men ready to fill up the gaps as they occur in the event of our being attacked, or for garrison duty.

Lieut.-Colonel T. H. Baylis, K.C. (late 18th Middlesex V.R.C.):—I am permitted by the Chairman to say a few words to you, and I congratulate myself, and I think we may congratulate ourselves on having the Right Hon. Sir J. H. A. Macdonald as a lecturer to-day. He has mentioned the date 1859, and I well remember it. I think he joined a year after that date, but I joined in that very year.

Lord Kingsburgh:—I joined in April, 1859.

Lieut.-Colonel Baylis:—Then we are contemporaries, and it gives me very great pleasure to find that is the case. I have always regarded

with the greatest respect and esteem Lord Kingsburgh whenever I saw his name mentioned in connection with the Volunteers. He is a man of remarkable legal intelligence and military knowledge, and we must all admit that he has brought before us to-day information of the greatest practical value. In the *précis* it is said that the Volunteer movement had its origin in patriotic feeling. I remember very well indeed in 1859 what caused that patriotic feeling: it was the threat of the French colonels to invade England. I also remember, if my memory serves me aright, that it was Louis Napoleon who advised us to get a Volunteer Force. Having regard to the *entente cordiale* being so great now between France and England, I can compare with pleasure the present time with that of our relations in 1859. As an old Volunteer officer I joined in the ranks and rose from private to lieut.-colonel, and naturally have had some experience; and I believe that what kept the Volunteer movement from being popular was the Government. The Government of that day was afraid of entrusting arms in the hands of the people. I was the senior churchwarden in the parish of Paddington during the Crimean War in 1854-55, and I remember we offered our services to the Government, and they would not accept us. Afterwards they accepted, but simply through the force of public opinion, and then the gallant colonel and myself joined. So that you see it was the threat of invasion. I think I am quite in order in saying that it is not only the patriotism but the loyalty of the Volunteers. The Government were rather afraid of their loyalty; they were afraid that they might become tools in the hands of the people. But they are a body remarkable for patriotism and for loyalty. There is one remark of the lecturer which I cannot quite agree with, and that is with regard to the decrease of the Forces. We all know that what we want is efficiency. We do not want numbers so much as efficient men, and everything that we can do to make them efficient is desirable. Therefore I am one who would see the Force reduced in numbers, but I would not have one penny less, giving the money to those who remain, making them more efficient. They should not be one penny out of pocket, and if they give their services they ought not to be anything out of pocket. I should like also to see commissions given more freely in order to attract officers. Another remark made in the paper is that a full cadre of efficient officers is of importance. No doubt that is so. The busiest civilian is the best officer, and our lecturer is a specimen. A man can always find time if he has a will, and I believe there would be the will to do it, but they do not see the imminent necessity. I should be delighted to see the Force efficient. In conclusion, I would simply say that if there is an invasion it will be sudden. It will be impossible to call our Militia together immediately; but we can always call the Volunteers together at once, because they are on the spot!

Colonel M. B. Pearson, C.B. (late 2nd Middlesex R.G.A., Vols.):—I am sure we have all listened with the greatest satisfaction to the lecture that has been delivered to-day by Lord Kingsburgh, and every word of it, I think, can be endorsed by us. There are two aspects of this question: the first and the broader aspect is as it affects national defence, and that I think may be left to Parliament and public opinion. The other aspect that appeals to many of us who have served for very many years in the Volunteer Force is as to how this proposed reduction in the Force and the present regulations will affect the Force itself. In November, 1901, when the new regulations were brought out, I for one looked upon those regulations with the greatest horror; I was a pessimist, and I could

quite see that they would have a very injurious effect upon the Force. In consequence of that I may take some credit to myself for having got them altered, and having initiated the great meeting of commanding officers in the theatre of this Institution in January, 1902, the result of which was to get a Departmental Committee of the War Office appointed and those unworkable regulations so far altered that instead of each company of the Force requiring at each drill to put 25 men on parade before they could count the drill at all, the present regulations were substituted, and they are much more workable. But we did not succeed in getting the compulsory camp regulations withdrawn or greatly modified. When we had an interview with the Secretary of State and the Commander-in-Chief at the War Office we pointed out very strongly that the effect of compulsory camp would tend to a very great decrease in the numbers of the Force. I venture to think that my views and those of many of my colleagues were justified. We have seen many of the best regiments in the Service depleted, and some reduced to half their original strength. You might take one notable instance: that fine regiment the London Rifle Brigade, which is now reduced to just over 500 men. I have seen that regiment 1,100 strong on parade; and it is grievous to think that regulations having such an effect should have been passed or have been continued when the disastrous effect was shown. With regard to the numbers of the Volunteer Force, it is not material to us individually whether the numbers are 200,000 or 300,000, but those who are acquainted with the interior economy of the Force know perfectly well that if each battalion or regiment is deprived of a certain number of the men, each unit is on the road to hopeless bankruptcy. There may be a few which keep up their numbers, and those corps which keep up their numbers are mainly those composed of men in daily employment who, as the lecturer said, can cease their employment with a reasonable prospect of going back to it; but a number of regiments that have been affected seriously are those containing men in permanent situations, who cannot ensure a fixed period of the year to be able to get leave from their employers to attend camp. The very foundation of the Force is that it should be composed of two classes: efficients and non-efficients. What does it matter to the Government whether a corps contains a certain proportion of non-efficients, provided no capitation grant is allowed for them? It is only claimed for those who fulfil the conditions of efficiency, and those conditions must be something that the Volunteer Force is capable of fulfilling. I think we must all agree with the lecturer upon that point. We have in times past, under existing conditions, incurred very large obligations. We have erected headquarters and entered into financial obligations which are still continuing, and if the Force is deprived of the necessary amount of financial support, it is perfectly certain that in the course of a very short time many regiments in the Service will become insolvent. One corps that I am very intimately connected with will, in this particular year, have its expenditure exceeding its income by about £400 or £500. Now, that corps cannot possibly go on. We are told by the Secretary of State that it was intended to spend the same amount of money over a smaller number of men; but that will not be spent in the shape of capitation grants. The capitation grant is only for the number of efficients, and unless you have a large number of efficients it will be impossible for each regiment to be able to pay its way. Now, as to the question of the physique of the Volunteer Force. It has been stated in Parliament that 33 per cent. of the Volunteers were rejected. I venture to say that whoever made that statement—I think it was the

Secretary of State himself—cannot be aware that there is a regulation in the Force for physical examination on joining; every recruit has to come up to the standard, and a very fair standard it is, too. I would just like to refer to one little incident as showing that the Volunteer Force is not composed of immature weaklings some would lead us to suppose. On one occasion, when Sir Henry Brackenbury was inspecting some men at a distribution of prizes—men belonging to my own regiment—he paused and said: "These are the men I should like to see in the Regular Service." Could there be a stronger testimony to the good physique of the Volunteer Force than such words as those coming from such an experienced officer as Sir Henry Brackenbury? It is a perfect myth that the physique of the Volunteer Force is not good; it is excellent. There is testimony from experienced officers, both in peace and war, to that effect. I will take the hint of the Chairman, because I am sure we shall be glad to listen to others who would like to speak; but I must venture to hope that the regulation as to compulsory camp will be modified, if not withdrawn. At the Royal Commission, before which I gave evidence last year, I was asked the question: "Do you consider that the Force is capable of meeting a foreign enemy?" and I said: "As at present organised, no; but that is not the fault of the Volunteers." The organisation must be made by the War Office, and, given the proper organisation —and there I entirely agree with General Patton, that the Force should be organised in divisions, complete in all arms and departments—given the Volunteer Force properly organised, I believe it will be able to meet a foreign Army, because the individuals composing it are as good soldiers as you will find in any part of the world.

Major-General Sir E. T. H. Hutton, K.C.M.G., C.B.:—I did not come here this afternoon with the intention of taking an active part in the discussion; but I thank Colonel Lonsdale Hale for having given me the opportunity of expressing the great personal appreciation and obligation I feel towards the learned and gallant lecturer, not only for much valuable information that he has given us in the lecture, but for valuable hints during the last 25 years. The lecturer is a typical Volunteer officer, who has contributed much towards the knowledge and experience of the British Army of to-day. Lord Kingsburgh, 25 years ago, was a pioneer of many principles which are now a portion of the administrative system of the Regular British Army. I am personally indebted to him for many valuable hints upon questions of organisation and tactics in early days. In making these remarks as regards Lord Kingsburgh, I feel that I should only be expressing the opinion of a very large number of my colleagues in the British Army—generals and other senior officers—when I say that we feel that we are under great obligation to the Volunteer Army of the United Kingdom. The Regular Army is in a large measure indebted to the Volunteer Force for the present high standard of rifle-shooting and for much of its popularity. In the early days of rifle-shooting, musketry was looked down upon almost, I may say, with contempt by the Regular Army, and by many old soldiers put on one side as a secondary obligation of military service. I am sure it is unnecessary for me or for any other Regular officer to testify to the value and importance of the "Volunteer" movement to the Empire. It surely cannot be necessary. It is mainly to the Volunteer movement that we owe the increasing popularity of the Army as a professional career for the classes from which we obtain recruits. All know what the Volunteer Force did in the South African War by contributing to the fighting element of the

regiments we led. The military forces of the Empire are dependent entirely on the voluntary system of enlistment, and it is in a large measure the voluntary forces in the United Kingdom and in the Colonies which have kept alive and promoted the military instinct of the people, and which enabled us during the recent campaign to put nearly 450,000 men in the field. It is commonly overlooked, especially in the recent debates in the House of Commons, that one of the most important elements which the Volunteer Force of the United Kingdom and Colonies contribute towards the military power of the Empire is in the inculcation of the spirit of patriotism, self-discipline, and self-sacrifice for the good of our country. Therefore, I view personally with the very greatest regret the necessity, if it is a necessity, of a reduction in the numbers in the United Kingdom. It is not for me, of course, or for any Regular officer on the active list, to criticise the action of the Government for one moment; but we do, I feel sure, all of us Regular soldiers, regret the necessity which there may be for reducing a Force that has contributed in the past so much to the efficiency of the military forces of the Empire, and which will most assuredly in the future contribute—if allowed to remain and take the permanent place which it occupies at the present moment—largely to any Army which the Empire may call into being at a critical time in our history. I should like to add my meed of appreciation also to the valuable service of the Volunteer companies during the South African campaign. I had several battalions that had Volunteer companies as a portion of their organisation, and every commanding officer and the brigadier-generals in command of the various units spoke, without any exception, in the very highest possible terms of their value, their military efficiency, and their discipline. One point I would like to emphasise, is Lord Kingsburgh's view of the Volunteer Force and their training. The most essential points for a military force are, first of all, organisation; second, trained officers and trained non-commissioned officers; and finally, the training of the men. I have always found in my various commands of Volunteer troops, mounted and dismounted, at home and in other parts of the Empire, that it is only by giving the very greatest possible latitude to commanding officers as regards the period of training and the time of training that it is possible to sweep into the Volunteer regiments the pith of the population. If you insist upon hard and fast regulation as regards periods of training and times of training, it makes it absolutely prohibitive for the best class of professional young men to join your Force. You therefore lose a mass of intelligence and also a physical value which is a most important element in any Army, and more especially in the British Army. I think, therefore, it is a great mistake, in dealing with Auxiliary troops—if you choose to call the Volunteers Auxiliary troops, although I prefer to call them the National Force of the Empire—to bind them down by hard and fast rules and hard and fast regulations. It is far better to leave the local circumstances to dictate the periods of training and the times of training, and to give great latitude to commanding officers in that respect.

Lieut.-Colonel T. M. Favell (1st Shropshire and Staffordshire R.G.A., Vols.) :—I wish to make a few remarks on the manner in which the Artillery branch, to which I belong, is armed. At the present moment I see it is said we are years behind. At present we are in possession of a gun which, I think, we received 17 years ago, and which was then an obsolete gun of the Royal Artillery. I do not know whether many have seen such a thing in the Royal Artillery, but it is a very long time since

it was there. Unfortunately we still have that gun. I suppose when the Royal Artillery get their new guns we shall have the old guns passed on to us. Only a few months ago we got an order to apply for a certain number of instruments, battery directors and other things connected with the equipment. We sent in the application in the ordinary course, and then heard from the Ordnance Store that we were not allowed them, and so we did not get them. To carry on our work we have gone to the expense of having them made at our own cost—a very considerable cost, too, as some of them are rather intricate instruments. Now we are going on using those and trying to learn our duties for the battery guns when we get them. If the Volunteer Artillery is really worth anything, I think we ought to have as good guns as the Royal Artillery. Let the Royal Artillery be armed first; but why should we be stopped by out-of-date guns? I think it would very greatly assist in the corps to which I belong, both in the training of officers and men, if we had the proper guns. It is very difficult to go on year after year training men with obsolete guns, and trying to teach them to do work which they have to do with the higher gun when they get it, although they do not seem likely to get it for some time. I certainly think the Volunteers, if they are to be continued, even though reduced to a highly efficient 200,000 instead of a partially efficient 250,00, certainly ought to have the highest class of guns. Then also there is the great danger of a mixed ammunition supply. It is bad enough as it is, but it will complicate matters a very great deal when you have such a number of ammunitions in the field. I quite agree with the remarks of the lecturer, that we are a very very long way behind, more especially in artillery matters.

Colonel Sir Howland Roberts, Bart. (Commanding the London Irish Rifles):—I did not come here this afternoon with any expectation of speaking; but there are one or two points I should very much like to refer to. With all the difficulties that Volunteers have gone through since the startling Order in Council of November; 1901, what I think has done greater harm and raised more feeling than anything else has been the statement made lately, that when we were called upon to assist the Regular Army by going out to South Africa, only 10,000 men could be got to volunteer. That was entirely a mis-statement, as was also the stated cause which led to the reduction of the number that were allowed to go. That call came upon us as a "bolt from the blue," for after Sir Howard Vincent and others had offered whole battalions for active service and had been refused, we never expected that any further reference would come to the Volunteers. But when it *did* come, 376 officers and men out of about 1,100 of my own corps volunteered to go out. We were ordered to send a full company, and later reinforcements, but the qualifying conditions were such that hundreds were barred out; we were told that no men under twenty years of age or under two years' service, and no man who was not a marksman, could go, and the men must be unmarried. Of course, these terms cut down our numbers; but it is not true that 33 per cent. of the men who came forward were rejected because of their medical unfitness. We sent out altogether 207, amongst whom we had 10 casualties. I am perfectly certain the statement I referred to has done an enormous amount of harm, and caused discouragement throughout the Service. Of course, being allowed to enlist men at 17, a very large number of our men *must* be under 20, particularly as they enlist, as a rule, in most corps for a term of three or four years. There is one other thing I should like to say: I do not think in this theatre, in

connection with a lecture on the Volunteer Service, we ought to allow the occasion to pass without mentioning one to whom the Auxiliary Forces of the country owe an enormous debt. It is not a question of politics, or of personal feeling; I mean that Auxiliary Forces owe an enormous debt to our friend the late Inspector-General, who has done for us what no one else has done. He has advocated our capabilities in the most whole-hearted way, whenever we wanted assistance, whether it was only in a war game between a couple of company officers at their headquarters, or anything else; he was ready to give his help and umpire himself. He would do anything to aid our wishes for increasing our usefulness. I have just come back from five days' outdoor exercises under him as Director at Chelmsford, and what we Militia and Volunteer officers have learned from him will be of immense value in case of need. He is not a man who will let anything pass untested when he intends to instruct; if one of us says: "I will place a battery on such a hill, or lay out such a position," even if it is a mile and half off he will go to see and criticise. He never allowed any of us to shirk our work, and any position we chose to take up had to be examined by himself, and nobody else. We owe him a very great debt of gratitude, and although his official connection with the Junior Services has now ceased, his personal and active interests are evidently still at our call.

Colonel T. S. CAVE (1st Vol. Battalion Hampshire Regiment):—The gallant Colonel in the Chair sends me a note in which he presumes that I am not allowed to speak. Well, so far as I know, I have not sold my freedom of speech, and therefore I will venture to use it for a minute or two. Several times when the lecturer was alluding to the tinkers in Pall Mall, my gallant friend the Chairman was winking out of the corner of his eye at me. I can only say if there are tinkers there, I am sure there are tailors, and there are even a few soldiers. Whatever weapons may be forged there, I venture to say that one which is to reduce the numbers of the Force was not forged in the department to which I belonged; indeed, I very much doubt whether the Pall Mall tinkers are responsible for it at all. I rather think it was forged in an office somewhat nearer this theatre—somewhere over in the Treasury Department. I hope myself that it will never take effect, and that for a very simple reason. It seems to me that it is based on the dictum of the Defence Committee, which has laid down as an axiom that invasion is impossible. I think that they will have to prove to us a very simple arithmetical proposition before they convince us, or me at any rate, that that is so. That proposition I should express in this way: The Navy, as I understand, is maintained at what is called the two-Power standard; now what is going to happen if three Powers combine against us? If they can prove that two is equal to three, then they will have established their proposition so far as three is concerned, though even then it would be desirable to go further to prove that two is equal to four or five, if we are to be fully assured. Personally I hope that the numbers of the Force will not be reduced. I do not know where all these non-efficient men, thirty, or fifty, or eighty thousand are to be found. If they are to be found, I should certainly like to see them eliminated from the Force; but I should like to see them eliminated from the Force not by striking them out but by making them efficient. On the whole, the propositions and the lecturer's way of putting the problems struck me as exceedingly able, and I hope that the effect of the lecture will go far beyond this room.

Colonel W. C. HORSLEY (20th Middlesex V.R.C., "The Artists"):—I am not prepared, Sir, to speak upon anything except one point, and that is the allusion which was made to the reduction of the Force as a whole. It may be that the proposed reduction is quite right from a Government point of view; but that is hardly a question for me to criticise. It is the way of doing it that seems to me so absolutely destructive to the best features of our Service. Anybody can say the Volunteers must be reduced, but to compel good men to go out and leave in the less desirable seems to me a very curious way of doing it; but that is really what is happening. I will try and explain a little more clearly what I mean. I do not consider the mere fact of my own corps, the Artists, going down 50 per cent. in three years is anything. We may not be the best, but I think we are a fairly well educated lot, and we think about things, and we read and write a little better than the average; but that is about all. We can shoot—we shoot better than the average. Those men have gone, and they will not come back, and it is all owing to these regulations. I cannot think regulations can be right that are doing us that harm. There was another corps congratulated by the Inspector-General about three years ago for increasing its numbers under the present regulations. They had 144 men more than they had in the year before, and that seemed a very creditable thing to him; but it was not creditable to the regulations or to the Volunteer Force. It was charitable to the men who joined. They came from an extremely poor district where they had no amusements or interests in life except little back streets. I am not exaggerating at all. The net result was that this Volunteer Corps in the district did a charitable and national service in enlisting the men, but it did not necessarily strengthen the Volunteer Service in the manner supposed. I think the Government will discover a little later on that the Volunteer Force, instead of containing men of the calibre it had four or five years ago, will be brought to the same level of intelligence and education as that which obtains in the Militia, and that the more intelligent portion of the Volunteer Force will be gradually weeded out to a very serious degree. If there is one thing the Volunteer is good for as a fighting machine it is his superior intelligence, and that part is being knocked out. The material will not be anything like so effective, notwithstanding the regulations as to medical examination and all the rest of it. That is one of the serious sides of the whole question to my mind, and all owing to some poor little regulation that a child might have told the Government beforehand was, to all intents and purposes, useless in its unelastic form, and liable to seriously affect the efficiency of any scheme devised to make the best use of all classes in the cause of our national defence.

Colonel the Right Hon. Sir J. H. A. MACDONALD, in reply, said:—I have really very little to say, because everybody has been so kind and there has been no adverse criticism. I have no doubt that some things I said might have been criticised very severely, if we had the right people here to do it. I cannot help saying how strongly I agree with the first speaker as regards the necessity of the youth of the country being gymnastically trained in a reasonable sense. I fear we rely too much on athletics, under the idea that football and cricket are sufficient to keep up the physique of the masses; but I think that is a complete delusion. The vast crowds that assemble at these football matches at Preston, Swansea, London, and other places—where there are 30,000 people looking on—hardly ever take any athletic exercise themselves, their greatest athletic performance con-

sisting in pelting the referee if their own side loses. They do not take an active part in athletics, and their mode of life is very much against their proper development. They are workmen or shopmen, and the way they carry themselves, and the slouching way they go about with their hands in their pockets, are very much against the proper development of the chest, which is the most powerful part of the human body for maintaining health and endurance. I remember once a recruit I had under me who could not swing his hands properly when on the march, and I found out afterwards that he never probably in his life walked without having his hands in his pockets. Then I was very much struck with another thing which fell from the gallant Colonel (Patton), about those men in his outlying district, the smallest man being 5 feet 8 inches and the tallest 6 feet 7 inches. That is just an illustration of what I wish to say about the great danger of destroying small units in outlying places, because there you have the finest physique, and the men are easily made into good soldiers, since they have not the conceit of town life. If you get hold of them you can discipline them very quickly. Colonel Baylis did not agree with me that the Volunteers should not be reduced; he would not mind reducing them if they were allowed to keep the money. He must have a very strong faith in the British Treasury if he thinks that any reduction of the Forces of the Crown is not effected mainly, or to a considerable extent, for the purpose of aiding another department—another department, as another gallant Colonel said, nearer here than Pall Mall. I am pretty certain that this proposal never would have been made had there not been considerable pressure from the Treasury to bring down the Estimates in connection with public service. One thing was mentioned by Sir Howland Roberts, as to the number of men rejected on medical grounds. I remember in Edinburgh, at the time of the South African War, the champion runner and jumper was rejected by the medical men there, I suppose because he was short of one tooth somewhere, so that he could not eat the biscuit! But what happened to a great number of these men I do not believe is known at the War Office. A great number of those who were rejected came straight up to London and joined the Imperial Yeomanry and got 5s. a day instead of the smaller sum that otherwise would have been paid to them. There is one suggestion I should like to make, as I am meeting a number of Volunteers to-day, and do not meet them often. I am a great believer in power transit for military purposes, and if we are to be reduced in numbers, it is a thing worthy to be considered whether we could not do as much as possible for the development of the motor car in connection with the Volunteers. It would be a good thing if gentlemen would take it up in their respective districts. A hundred thousand men can be transferred from the very centre of the country to any point on the coast in the course of 15 or 18 hours, and that is worth a lot of men scattered about that you cannot get there under 4 or 5 days, by first collecting them and then getting them into railway trains. Whether the people who drive horses like it or not, the country is going to be covered with motor vehicles of every kind and description. We have a Railway Corps, and I should like to see a Motor Corps formed, not as it is now, under the supposition that it is never to be used except for carrying generals or umpires, but for transit purposes as well. I am quite certain that difficulties about transport would be removed and all difficulties about moving troops in our island would be overcome if we had a reasonably organised motor system. You could push out 30,000 men in the course of a few hours from the very centre of England without the slightest

difficulty, and have them all fresh and ready for their work, instead of being marched off their legs. As regards artillery, there is very little. There were only six batteries when the artillery went away to South Africa. It is of great importance to bring the guns in efficient and good condition into any position where we require them. All artillery guns for the defence of a country like this should be drawn by motor power, and the teams of horses necessary for taking them over ground where the motor cannot go would be kept perfectly fresh, and would not be required to do long traction marches, becoming worn out and unfit for their galloping duties afterwards. There is a great field for thought and development there; it is a subject I am taking a very great interest in, and I may be forgiven for taking the opportunity of recommending it to my friends here to-day. I just want to make one explanation. I found I made a mistake by transposing the figures of the London Irish and the London Scottish; but I will take care it is put right when the lecture is published. Both these regiments are commanded by old friends of my own, and we all know that it is not their fault that the numbers have fallen away. I thank you most heartily for the way in which you have received what I had to say. I am afraid I put things sometimes a little stronger than they ought to have been put. As I once said in this place, out of the abundance of the heart the mouth speaketh. Although I am no longer an active Volunteer, I still take a keen interest in its affairs, and am prepared to fight for it in the only way I can now fight, namely, by urging its interests to the utmost of my ability whenever I get the opportunity.

SOME OBSERVATIONS ON SOUNDING, AND THE ADMIRALTY CHARTS.

By Lieutenant H. W. H. HELBY, R.N.

Thursday, 23rd March, 1905.

Rear-Admiral Sir W. J. L. WHARTON, K.C.B., F.R.S. (late Hydrographer of the Navy), in the Chair.

[In the absence of the Lecturer, the paper was read by Lieutenant H. T. A. BOSANQUET, R.N. (Retired).]

THE Admiralty charts are familiar to all British seamen, and great reliance is placed on them; so much so, that merchant-ships, especially steamers, having an Admiralty chart of the coast on board, rarely trouble to use the lead so long as they are able to fix their position by the land.

It is taken for granted with a simple faith that if the chart shows five, ten, or twenty fathoms, or any other depth at any particular spot, nothing less than that depth of water exists there; and when occasionally a vessel does strike the bottom where the chart shows that she should have been able to float, or even if the chart shows no sounding at all, those who lose their money by the accident are considered to have a legitimate grievance.

And yet the Admiralty charts lay no claim to infallibility. No less a person than the late Hydrographer has laid down that it is impossible that any survey can be so minutely done as to make absolutely certain that no pinnacle rocks remain undetected, and that this opinion is correct is proved by the frequency with which new rocks turn up in recently surveyed areas.

Moreover, many of the charts in existence are from surveys of forty or fifty or even more years ago, and in those days it was only in the most frequented harbours that the sea bottom was really carefully and systematically examined.

The pamphlet issued by the Hydrographic Office, entitled, "Notes Bearing on the Navigation of H.M. Ships," directs particular attention to the date of a chart as a guide to its trustworthiness; but it is doubtful if this is appreciated to its full extent even in the Royal Navy, still less so in the merchant service.

A steamer, anxious to save time and coal, seeing fifteen fathoms marked on the chart a few cables off a point she wishes to round, will cut round the point at that distance or even closer, confident that it is steep-to, not realising that possibly that fifteen fathoms is the

only sounding that was taken off the point, and that an unmarked rocky ledge may run out on one side or other of the sounding to a greater distance from the shore.

In the days when these charts were made, seamen were constantly exhorted to rely only on the lead. "The lead is the only sure guide" was the common phrase, and one comes across it sometimes even in the present editions of the sailing directions; but what steamer ever slows down nowadays to use the lead on a charted coast?

The belief in the lead is, in fact, on the wane, and, indeed, if the chart gives the general depth of water, the lead can do no more; it will not give notice of approach to pinnacle rocks, which are the greatest dangers to navigation at the present day.

Let me give two examples. In the year 1890 the British India steamer "Quetta," in charge of an experienced pilot, struck on an uncharted rock in the Adolphus Channel, a little to the southward of Torres Straits. She was pursuing the course that had been followed by ships of that line for several years. The general depth of water shown by the chart, which was apparently fairly well sounded, was eleven fathoms. When the channel was re-surveyed shortly afterwards, the diameter of the base of the rock, which had nine feet on it at low water spring tides, was found to be only about two hundred yards. That is to say, eleven fathoms would be obtained on each side of the rock at a distance of one hundred yards from its centre. Had the "Quetta" been going only five knots, and heaving the lead from both chains, she could not have stopped, after the leadsman had got shoal water, in time to avoid striking. As it was, the ship sank in a few minutes, and there was distressing loss of life.

The Duke of Buckingham shoal, on the same coast, is another of the same character, a coral head. The place was surveyed in 1892 on a scale of two inches to the mile, and the lines of sounding run by the surveying vessel were parallel to each other and about two hundred and fifty yards apart.

A rock had previously been reported to exist somewhere in the vicinity, but although a special search was made, it was not discovered. A few years afterwards the "Duke of Buckingham," a deep draught ship, confidently using the newly-published chart, struck on the shoal. Fortunately, in this instance, there was no loss of life.

Coral waters are, no doubt, especially dangerous, but a careful examination of almost any place where the soundings are irregular (as, for example, the west coast of Scotland) will show how very little warning the lead will give of a vessel's approach to one of the rocky pinnacles that abound in such places.

The conditions of navigation are thus quite different to what they were in the days when charts were few and every seaman felt his way for himself with the lead.

Every year the opinion will become more fixed that an Admiralty chart ought to be as reliable as a "Bradshaw's Guide."

Is this opinion to be combated, and are seamen to be convinced that they must still trust to their own precautions for avoiding unknown dangers, or are the charts to be so improved that we can feel confident that there are no unknown dangers to be guarded against?

I believe the first to be impossible, and I am certain that the second in its full extent is no less so. The solution seems to lie in a combination of the two.

Let us take a rapid glance at the evolution of modern hydrography. Some time in the 16th century printed maps of the sea began to make their appearance. But they showed nothing more than a rough, and largely imaginary, outline of the land. The sea was covered all over with pictures of ships, dolphins, savages, and other strange hieroglyphics. What was aimed at was to show the correct bearings and distances from port to port, and for this purpose lines of direction were frequently ruled across the sea. These maps were innocent of soundings. In pilotage waters local knowledge was relied on.

Captain Cook, though not the originator, was the first great exponent of accurate surveying. But his work was rapid, not detailed. His first care was accuracy of geographical position. Such reefs and shoals as came under his notice as he coasted along he placed on his chart, but he could not afford the time to work out channels or harbours.

The exploring tadpole was, in fact, only just beginning to turn into the surveying frog. The change went on gradually under Captains Vancouver, Flinders, Owen, King, Stokes, and others, but the next great innovator was Captain, afterwards Admiral Sir Francis Beaufort.

When he became Hydrographer in 1820 he threw a tremendous enthusiasm into the surveying business, and expected it from everyone under him. Overpowering zeal for the great work on which he was employed was to be the rule for every surveyor. Ordinary naval duties were pushed to the background, and the surveying service became the special and separate branch it has ever since remained.

It was probably about this time that pride of accurate triangulation succeeded, or, rather, was superimposed upon, pride of geographical accuracy. Coast-lines were very much more carefully charted. The compass as a surveying instrument dropped more and more out of use in favour of the theodolite. A stranger using the chart could now fix his position with certainty by cross bearings. No reef that showed its head above water at the lowest spring tides was ever left out, the sea was carefully scanned from commanding points on stormy days that any breaking shoal might be discovered. Information was sought from local fishermen and others of submerged reefs, and so well was this work done that the sea in surveyed waters was practically safe for the shallow draught vessels of that date. The Admiralty charts thus acquired the reputation for reliability which has been their proud possession to the present day.

If, however, anyone acquainted with marine surveying examines the original charts of 1840 or thereabouts, he will be struck by the scarcity of soundings. Except in selected harbours, which were sometimes done on a large scale, systematic examination of the sea bottom was not undertaken. Systematic soundings in parallel lines on and off shore is a lengthy business even nowadays, when we have the advantage of steam for ship and boats. In those days it was almost an impossibility. At any rate, the time required for it, and consequently the expense, was so great that it would have been absurd to undertake it on coasts as yet unfrequented, and which might possibly not be frequented by vessels for decades to come.

Enough soundings were obtained when tacking off and on, or pulling along the coast in boats, or going to and from the various coastal stations to show the general character of the bottom, and this

was all that could be expected. The charts were generally published on a small scale, and to the inexperienced would appear, from the apparent closeness of the figures, to be thoroughly sounded. But this was seldom the case.

The advent of steam-ships, which are not precluded by considerations of wind from hugging the coast, and the increase in the draught of all vessels, were the new elements that rendered more detailed sounding necessary.

The method generally adopted was to run lines of soundings parallel to each other and perpendicular to the coast, and at distances apart varying according to the scale of the chart.

Speaking generally, lines a quarter of an inch apart on the paper were considered to be fairly close for water under twenty fathoms. Over that depth the lines were wider. So that on a scale of one inch to the mile, a common scale a score of years ago, and fairly often used still, a rock a quarter of a mile in diameter at the base might remain undetected if it happened to be midway between the lines of sounding. In a recent "Notice to Mariners," referring to the rock in Yung Ching Bay, on which H.M.S. "Leviathan" grounded, the following caution is issued:—"As the survey of this part of the coast is on a scale of only one inch to the mile, it is necessary to be cautious in taking up anchorages, as it is quite possible other pinnacles may exist, and it is advisable to sound round the vessel when anchored." When the rock was subsequently examined it was found to have $2\frac{3}{4}$ fathoms on it, and soundings of under five fathoms extended to a distance of one and a half cables from the summit.

The greater part of the passage inside the Barrier Reef on the coast of Queensland has been surveyed on a scale of two inches to the mile. The general depth in the middle of the channel may be taken as from twelve to twenty-five fathoms. The lines would be about 250 yards apart. As was shown in the case of the Duke of Buckingham shoal, it is quite possible for a pinnacle to remain undetected between them. The lines can, of course, be closer than this, but four or five lines to the inch is the average for most surveys, economy of time being an important consideration.

The coasts of England and Scotland are being surveyed on a scale of 6·9 inches to the sea mile, this scale being adopted because it is the scale of the maps published by the Ordnance Survey, from which the coast-line and topography are to some extent derived. Four lines to the inch represents in this case a distance apart of 74 yards. Recent surveys conclusively prove that even this distance is too great on an irregular bottom.

The different kinds of bottom fall naturally into three great divisions, which may be named as follows:—

1. The Tidal Deposit bottom, which occurs in places where sand or mud has been deposited on the floor of the sea for long ages.
2. The Aerial Denudation bottom, the contours of which were formed above water by aerial denudation, and which has sunk below the sea too recently to allow of a thick covering of deposit.
3. The Coral bottom, formed by the deposit of broken pieces of dead coral, coral sand and mud.

As is always the case in nature, these divisions overlap one another, but each has some characteristic features.

The Thames Estuary, the Downs, and Yarmouth Roads are instances of the first. In this kind of bottom the detached shoals are always found to lie more or less in line with the direction of the tidal stream. The direction of the stream influences the whole contour of the bottom, and lines of soundings run across the stream will strike the steep slopes perpendicularly. This is considered to be the most accurate method of sounding. In the three cases given the adjacent land is all of a flat and smooth description. This is very frequently the case near tidal deposit bottoms, or perhaps it would be more proper to say that the latter generally results from the former. There are no steep submarine cliffs or craggy summits to be covered over and smoothed down. The mantle of mud and sand overlays everything, much in the same way that a mantle of snow covers a flat country on dry ground. But if the geological character is such that there are craggy ledges or pinnacles, it is obvious that the greater the deposit the more gentle will be the slope approaching them, and therefore the greater the ease with which they will be detected by the lead.

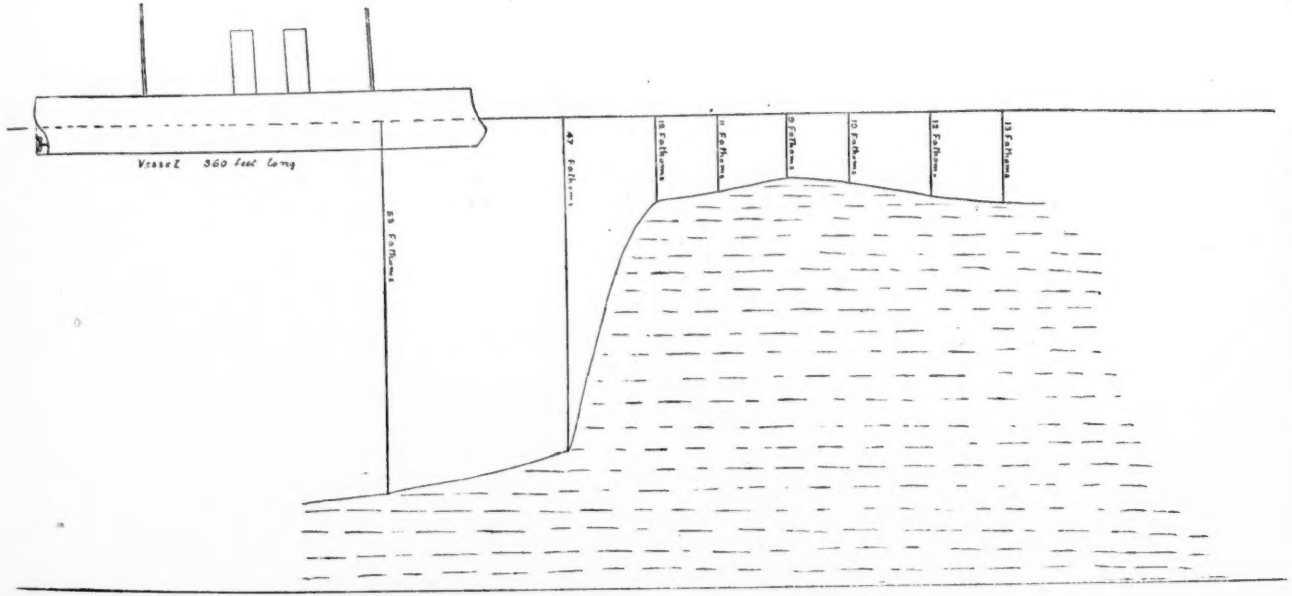
The second type of bottom, which I have called that of aerial denudation, is well exemplified in the Scottish sea lochs. Sir Archibald Geike, in his book on the "Scenery of Scotland," shows that the Scottish coast-line has been, in comparatively recent geological times, many hundreds of feet higher than it is now. The bottom of the lochs was shaped in the open air by the agencies of rain, frost, and mountain torrents, and was, no doubt, irregular, craggy, and precipitous, as the land surface is now. Either from want of time, or because comparatively little sediment is carried down from the hard land surface, the bottom is only thinly coated with deposit, very frequently it is quite bare rock or only covered with seaweed. The submerged ledges and pinnacles are consequently quite steep-to, and the most careful sounding is required to get any indication of them. The general irregularity of the bottom complicates matters still further, for among so many various soundings it is difficult to decide which are indications of dangerous rocks and which are not. The only way out of the difficulty is to sound as closely as ever time will admit of.

If a well executed chart of one of these lochs is compared with a geological map of the district, it will be noticed that the direction of the lines of rocky ledges corresponds to the direction of the strike. If we look at the land itself we see that this might have been expected. Everywhere we find ridges, on one side of which are little cliffs formed by the breaking off of the upturned strata, while the other side slopes away more or less gradually, according to the dip. This kind of bottom should therefore be sounded at right angles to the strike.

The third division is the coral bottom. We may take the great Barrier Reef as a good example.

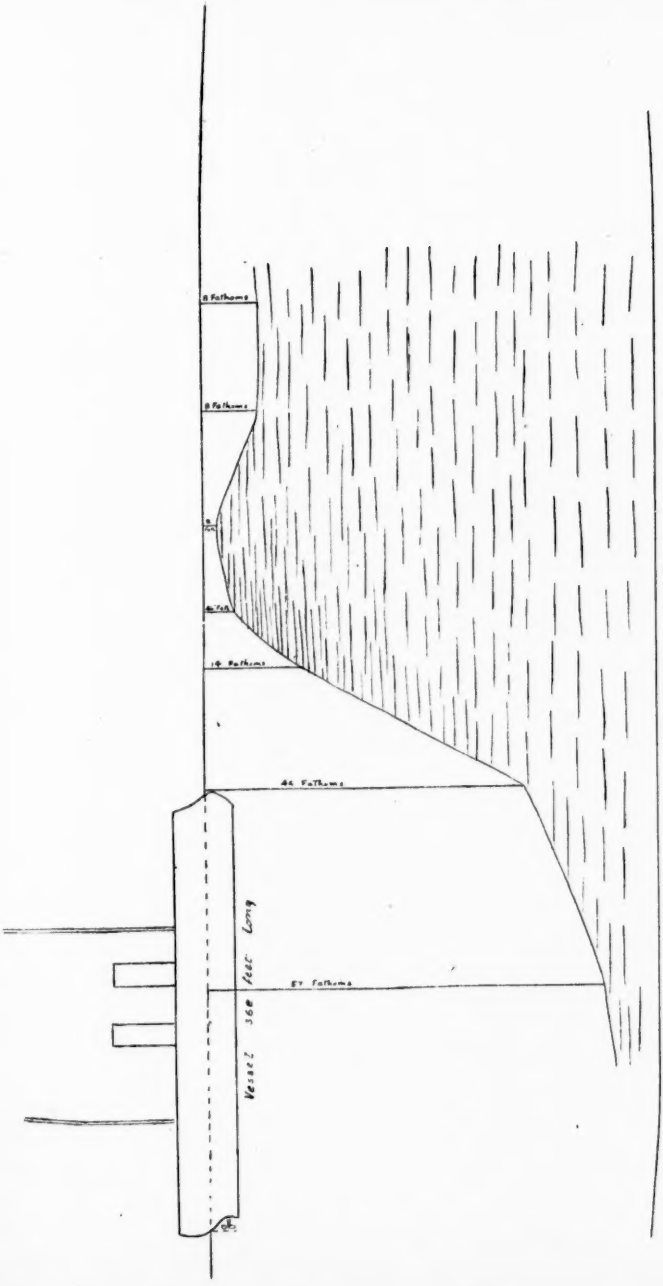
The outer reef faces the open ocean, and the coral animals, revelling in the wash of the breakers, grow continually outwards. In their rear they leave a submerged plateau covered with their bones and with a soft white mud formed by the calcareous matter of which they are composed.

On this plateau grow numerous minor reefs, which are the principal danger to the navigation of these parts. I believe that very

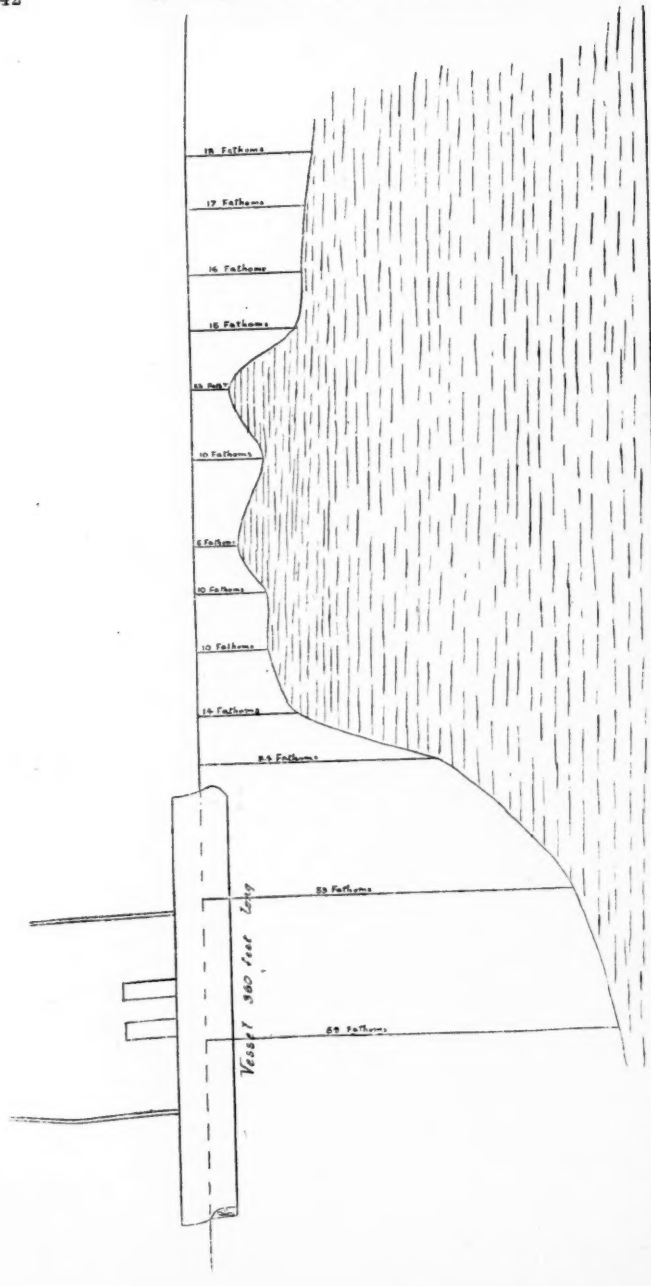


SECTION SHOWING SUBMERGED SLOPE. LOCH NEVIS, SCOTLAND.

Scale : 10 fathoms = $\frac{7}{16}$ inch.



SECTION SHOWING SUBMERGED SLOPE. LOCH NEVIS, SCOTLAND.
Scale : 10 fathoms = $\frac{7}{10}$ inch.



SECTION SHOWING SUBMERGED SLOPE. LOCH NEVIS, SCOTLAND.

Scale: 10 fathoms = $\frac{7}{16}$ inch.

little is known about the growth of these minor reefs, some of which come up to the surface and some of which only rise a few feet from the bottom. Divers who have been down on them report them to be so foul that it is only with great difficulty that they can keep their pipes clear, and when sounding over them the lead-line frequently becomes entangled.

They appear to be characterised by a profusion of branching madrepores, with great lumps of hard brain coral interspersed. These latter lie about like big boulders, and may be easily missed by the lead, however careful the sounding, while from their unyielding nature they are especially dangerous to ships. Whether these minor reefs indicate slight rises of the original bottom, inducing the coral animals to grow there, or whether they are formed promiscuously, does not seem to have been settled, nor is anything yet known for certain about the rate of their growth.

The opaqueness of the water, caused by the suspension in it of minute particles of lime, renders it almost impossible to see them even when they rise to within a couple of fathoms of the surface. There would seem to be no rule to show in what direction they may be expected to lie. Some are elongated, some roughly circular. In fact, they are of all shapes and sizes, and the old rule of sounding perpendicularly to the coast seems to be the best one to go by.

Enough has been said to show that without infinitely close sounding it is impossible to be sure of having located every danger to navigation. There must, of course, be a limit to the closeness of the soundings. Time does not allow of the whole sea in pilotage waters being covered with soundings twenty yards apart, and even if it did some pinnacles might still be missed. This being the case, it becomes a question whether any means can be found to remove the risk that deep-draught vessels run of striking on unknown pinnacles in places that are supposed to have been surveyed.

I submit that the only way to make quite certain that any area is clear of dangers is to sweep it.

Now sweeping is an operation that most surveyors dislike. It takes an exceedingly long time, and gives, of course, if the channel be clear, only a negative result, which does nothing to increase the apparent output of work. One would only occasionally be rewarded by a find in the shape of a pinnacle that had escaped the sounding boats. There is no special apparatus for sweeping, and very few people have had any practice in it, all of which tends to keep up the disfavour with which it is regarded. I venture, however, to suggest that if modern mechanical appliances were drawn upon, an arrangement could soon be found which would render sweeping both easy and rapid.

There is an excellent machine which goes part of the way towards solving the difficulty, and which has already been in use for some years, known as James' Submarine Sentry. It consists of a wooden kite which is towed astern of the vessel, at a depth below the surface that is governed by the amount of towing-line paid out. The kite carries a trigger projecting from its under side which, on touching the bottom, disengages a slip, allows the kite to rise to the surface, and rings a bell on board the vessel. Properly used this machine ensures that the sounding vessel does not actually pass over any considerable inequality of the bottom without detecting it. Its action

is, however, limited to the single line along which it travels, and it is possible for it to pass within a few yards on one side of a pinnacle and give no warning. But it is probable that with a few experiments the submarine sentry could be developed in such a manner that it would sweep a track perhaps a hundred yards wide.

The following is a suggestion of the direction that the development might take. I recognise that what seems to be simple on paper often presents unexpected difficulties when put to the test, but this is a condition common to every new device, and if once rapid sweeping is allowed to be desirable and important, I think these little difficulties will quickly be surmounted.

I suggest that instead of one kite traversing a single line astern of the ship, two kites be used, one on each quarter, and that each kite should be fitted with a fixed rudder which will cause it to sheer out on the quarter from which it is towed. Also that the two kites be joined together with a wire line (the wire used in Lucas' Sounding Machine would be suitable). The joining-line should carry at intervals of about thirty feet bunches of fish-hooks, or very small grapnels with sharp points that would catch against any hard substance or stick into any seaweed with which they came in contact. One end of the joining wire might be attached to a spring slip on one of the kites, so that any extra strain would cause it to slip, and the kites would immediately diverge more widely in obedience to their rudders, or it might perhaps be attached to the triggers of the kites and so cause them to disengage and come to the surface when the grapnels found a rock, or the grapnels might be fitted into small cartridges of phosphide of calcium which would be torn open and which would float to the surface and give notice by their smoke.

The drag of the water on the joining-line and the strain of the diverging kites would keep it in a horizontal position and prevent the centre from sagging down. The ship could probably travel at a speed of seven or eight knots, so that a good deal of ground could be swept in a comparatively short time.

The places first selected for sweeping would naturally be entrances to harbours when the bottom is rocky and uneven, rocky channels through which ships are obliged to go, and off rocky points round which ships are continually passing. The area thus swept might be shown on the chart by a light blue tint with large, faint blue figures on it showing the depth to which it had been swept.

As these blue patches gradually accumulated on the charts and seamen got accustomed to them, they would come to prefer to use the swept tracks to those that were not so guaranteed, and it is likely that the underwriters would make their use a condition of insurance. Accidents would become of less frequent occurrence, and surveyors would be saved the mortification of seeing ships come to grief through a misplaced confidence in their newly-completed charts.

The Otter Sweep.

An Arrangement for Sweeping for Rocks with one vessel only.

The sweep is on the principle of the trawl known as the otter trawl, which has been in use among the North Sea fishermen since 1894.

In the otter trawl, two flat boards called otters are attached, one at each end of the headline of the net, in such a way that when the trawling vessel moves ahead the two boards sheer outwards and stretch the net from 60 to 120 feet, according to the speed of the vessel.

In the otter sweep the otters are connected only by a thin wire, which offers small resistance to the water. They will therefore sheer outwards to a much greater extent than when a heavy net has to be dragged along the bottom. The sweep differs from the trawl also in this respect: that while the latter is dragged over the bottom, the former has to be towed at a definite depth below the surface.

This is effected by attaching the otters to buoys by a known length of wire, the buoys being of such a shape as to offer the least resistance to being towed, in order that the suspending wire may be as nearly as possible perpendicular.

A correction must be applied to the length of the wire to arrive at the depth of the otters below the surface.

The otters are circular iron discs, weighing about 25 lbs., and they are fitted with a sloping flange on each side, which slopes outwards and downwards, and also forwards and downwards, the object being that the flanges should act as horizontal rudders, causing the otters to keep at the greatest depth permitted by the suspending wires. Without this the speed at which they are towed might cause them to rise, in spite of their weight.

The joining wire between the otters is thus stretched as taut as possible, and should it meet with any obstruction it must carry away, allowing the otters freedom to diverge and sheer right out on each quarter, by which means notice is given that a pinnacle has been met with.

Captain A. M. Field, R.N. (Hydrographer to the Navy):—Although it is true, Sir, as the lecturer has stated, that it is impossible that any coast survey can be so minutely done as to make absolutely certain that no pinnacle rocks remained undetected, yet lines of soundings on the 6·9-inch scale can certainly be run so closely as to reduce the risks to very small proportions. It is a question of time—which is money—to make sure that there are no dangers existing. Given a sufficiently large scale, with lines of soundings closely spaced, it is highly probable that some indication of any danger that exists will be disclosed. This probability could be still further largely increased by crossing the lines of soundings, and if necessary recrossing them at a different angle; but I do not pretend to say that even that provides absolute security; still, there is a very high degree of probability of security. As a matter of fact, however, it is not on the large scale surveys, which are closely sounded, that undetected dangers are of frequent occurrence; it is on the small-scale surveys of the coasts of an inch to the mile, or less, and that is the great difficulty to be overcome. Success in finding hidden dangers mainly depends—in fact I might say entirely depends—upon the scale of the survey. When you determine the scale of the survey you practically say to what limits the soundings are to be run. Methods in ordinary use, therefore, are efficient, though laborious, I admit. The scale of coast surveys is governed to a large extent by the distance to which it is necessary to carry the soundings from the points which are used for fixing. The station pointers that are used in the boats must be of moderate size; therefore, of course, you cannot increase the scale of a coast survey

beyond certain limits, and as a matter of fact the inch scale will still, I think, have to be retained. But if you want to examine the ground still more closely than can be done by merely running the lines parallel to one another, then you must cross the lines of soundings and recross them at another angle. If the lines are closely spaced, that should give at any rate a very high degree of probability of discovering any dangers. There is no doubt, however, that a system of sweeping would change the various degrees of probability, which depend on the scale, into certainty if that system was really efficient; but unfortunately it has yet to be invented. However efficient a system of sweeping might be, it would still be necessary to develop the general conformation of the bottom by the ordinary methods of sounding, and for that purpose the original parallel lines of soundings would still have to be nearly as closely spaced as at present. It then becomes a question, whether it may appear desirable to sweep or to run intermediate lines, with re-examination of any doubtful spots. The latter plan is that which is usually adopted now; but if a method of sweeping which embraced a sufficient breadth of front could be devised, then the system would be very desirable. You must have a sufficient breadth of front to provide for the lines over-lapping one another. On small scales this is especially necessary, or the lines would be so close together that your fixes would fall on top of one another, and in the absence of ideal transit marks, which occasionally you do get, but very seldom, you would be dependent upon the fixes while sweeping; but if the lines did not overlap one another so as to cover the whole ground effectively, you would be worse off than before, because soundings (even though they may be on the line) give you position indications, whilst sweeping gives you only negative information. It is on small-scale surveys that sweeping would be most useful if it were practicable, as it is on those scales that undetected rocks are most likely to occur; but in order to sweep large areas on small scales, a wide front is absolutely essential, and that is the difficulty which has to be overcome before sweeping can be practised to any advantage. Sweeping on large scales and over small areas is easier and is sometimes carried out, but only in the last resort. After you have closely sounded over a suspected area and can find nothing, then it is sometimes advisable to make certain of it by sweeping; but it is a long operation, and the chances are if you choose to sound on a very large scale or on transit covering the ground minutely, you will clear the matter up satisfactorily quicker than you could by sweeping. Large scales make it easier to sweep, because you are able to fix the lines so accurately that you can afford to sweep on a small front. In practice, however, the sounding method is generally the quickest and equally efficient, and it is only on rare occasions that it is necessary to resort to anything else. I should welcome any efficient system of sweeping which would give the broad front which I have emphasised, but I am afraid the system of kites proposed by the lecturer is not a very practical solution of the difficulty. I have not studied the otter trawls, and I should be sorry to offer an opinion upon them before doing so; it may be a feasible solution, but I should not like to say off-hand. If anybody can invent something of that sort which is really practical, I shall be very glad to see sweeping carried out; but until then I think the ordinary method of sounding is sufficient.

Rear-Admiral USBORNE MOORE :—The Hydrographer has gone so fully into the question that there is very little for anyone else to say; but I would submit that if you look at the Board of Trade returns you will

find that very few vessels at all are lost through inexact charts. At one time I thought there were a great many; but I once borrowed ten years' Returns from the Board of Trade, and on going through them very carefully I found that, at the outside, about one per cent. of vessels were lost from what might be called errors in the charts. A great deal is said about errors in charts causing the loss of ships, but there is very little reality in this complaint. The remedy which appears to me to be most efficacious for thoroughly clearing up the dangers connected with the coast is to offer rewards to the fishermen. Some years ago, when I was in China in command of a survey on the China station, the Chamber of Commerce of Hong Kong voted a sum, which they placed at my disposal for this purpose. Some of the money was used, and the rest was returned when the ship left the station. If a similar plan were adopted everywhere, I think there would be no difficulty about clearing up the question where these rocks are without using otter trawls, or this application of the kites of James' sounding machine. It seems to me also that a large sum of money ought to be voted by the Government for this purpose, in England. As far as I know, nothing is specially set aside for that purpose. I should say that a sum of £2,000 or £3,000 per annum would not be excessive if it enabled us to give such rewards to fishermen as would clear up all the dangers round the British coast. I should like to say that the machine mentioned by Lieutenant Helby, which he considers could be used for a breadth of 100 yards, and which is an application of James' sounding machine, is, in my opinion, quite useless. I do not believe the James' sentry can be used for that purpose at all on account of the nature of the kites and the strain on the lines on the quarter. I do not believe a rudder such as he describes attached to each kite would answer the purpose at all; and if it did, it would so deflect the angles of the kite (which was originally invented for towing astern) that it would be useless. With regard to the otter arrangement, it seems to me that you might just as well use an ordinary sentry astern. It does not spread over a very large distance, as far as I know, though the lecturer has not told us exactly what the distance is. I do not think it would do much more good than if you used the sentry right astern. The whole question is one of pounds, shillings, and pence. Taking it as a pretty rough rule, in a sea where there is any tide-way or strong current, a survey on a scale of 10 inches to the mile will cost ten times as much as that on one inch to the mile. I think you will probably agree with me that that is a fair estimate. If the Government is prepared to vote a sum of money for the surveying service which is ten times the amount they vote now, I have no doubt you can make every part of the world, in the course of a few hundred thousand years, perfectly safe; but during that period a great deal of time would be lost owing to the most important parts being only partially surveyed. It seems to me the system which the Hydrographer is using now is the right system, namely, to insist upon close soundings, and to survey those places only on large scales where ships are probably likely to anchor, and the approaches to anchorages. The whole thing is a matter of money. If Parliament will vote ten times the sum of money they do now, I have no doubt the Utopian desires which Lieutenant Helby has placed before us this afternoon will be realised. As Lieutenant Helby remarks in his paper, the pinnacle rocks are the great difficulty. In China, pinnacle rocks are usually found by two methods. In the first place, on a calm day—which is an extremely rare occurrence—the set of the tide shows a fan-shaped ripple over them, and you can detect them in that way; but more often than not they are detected

by a deeper sounding than the average. You may get a sounding of 15 fathoms, we will say, between two soundings of eight fathoms, and that indicates a scour round the hard surface of the rock. I do not think the systems which have been presented to us this afternoon will clear up the difficulty with pinnacle rocks, because I do not think that either of them is feasible.

Captain W. F. MAXWELL, R.N. :—I was unaware that this lecture was to be delivered until this morning, so I am totally unprepared to speak. Fortunately I think everything in connection with the subject has been said by the Hydrographer and Admiral Moore, except one thing, and that is with regard to the use of the otter trawl. I have had some little experience of the otter trawl, and I have seen it in use during my surveys of the North Sea and on the banks south of Scotland and south of Ireland. I think there might be developments of the otter trawl which would possibly give it an area, as Lieutenant Helby says, of 120 feet; no more certainly; that would be the very outside limit. I have never really thought about that question; it is an absolutely new idea to me. The difficulty is one that we are all familiar with in the ordinary dredging for rocks, and I do not see how it can be got over, namely, the difficulty of maintaining the so-called wire or bar or whatever you use at the depth at which you wish to dredge. I dredged last year for a rock at Valentia, and we exhausted every possible means. We sounded until we could not sound any more; but the opinion was so strong that there was a rock there that I undertook to dredge in the usual fashion, which is known to all surveyers here. The only result we got was that we found by a series of careful surveys a depth of 17 feet could not possibly exist there; but the dredging over that small area—an area I suppose not more than 100 feet square—took us three low waters of spring tides, so that you can imagine what the cost of a complete survey would be if we had to spend three spring tides dredging over an area of 100 square feet. The cost of sweeping, unless a new method is devised, would be enormous. On another occasion I dredged the Carlingford Gut, which was a thing that had to be tested to within a few inches, because the Harbour Commissioners on the one hand said the depth was there and the steamship company, on the other hand, said the depth was not there. The dredging of that particular place, which is not wider than a common street, in fact not as wide as the ordinary London street, took us four whole low waters of spring tides. That is another example of what the expense would be unless some new system were established. We dredged with a 30-foot iron bar, and supposing you multiply that by four—I do not believe the otter could possibly do more than 120 feet—you will see that the cost would be of making a survey, even of the entrance of a small harbour by dredging.

The CHAIRMAN :—Knowing what you do of the practical use of the otter trawl, do you think that you could stop and turn round a corner with it?

Captain MAXWELL :—No; you have to get in your otter again.

The CHAIRMAN :—You have to haul in each time?

Captain MAXWELL :—Yes.

Captain E. W. CREAK, C.B., R.N. :—I hope the Hydrographer and Admiral Moore will agree with me that the lecturer has missed one

point, namely, that in rounding corners closely a danger may exist which he has not noticed, and to which no soundings, however close, will give a clue. I refer to the possible disturbance of a ship's compass caused by highly-magnetised material in the bottom over which she may be passing. Supposing, for instance, a ship is steaming in a northerly direction past a Continental coast or island in the Northern Hemisphere; if she hugs the shore or rounds a point too closely it is possible that the north point of the compass will be drawn towards the shore, and she will be in danger, especially at night. There is a ready means by which the localities subject to these magnetic disturbances (magnetic shoals they have been called) can be found, and which has already been used to great advantage by the Hydrographer and Admiral Moore. I call attention to this subject because there is a tendency nowadays to cut corners, and in my opinion, in view of what I have just said, it is a very risky operation. There are several places in the world which, I think, should be particularly examined as regards local magnetic disturbance. I have heard that the Hydrographer has taken the question in hand, and I hope he will see it followed up in all parts of the world where a surveying-ship is at work. It is a very important question, which is hardly realised by many sailors.

Commander W. F. Caborne, C.B., R.N.R. :—The subject dealt with in the paper we have just listened to has never hitherto, I believe, been brought before the members of the Institution, and, accordingly, Lieutenant Helby is to be congratulated upon having taken a new departure. That great reliance is deservedly placed upon the Admiralty charts is certain, and all seamen owe a debt of gratitude to the British Hydrographic Department, which I may fearlessly characterise as the best in the world. Such being the case, and holding the opinion that it is usually wise to let well alone, I recently read in a great London newspaper, with much concern, that one of the projected naval reforms is the transference of the hydrographic section of the Admiralty to the Board of Trade. It is to be hoped that this is only an idle rumour, as the latter would not be able to conduct the surveying service so efficiently as the former has done in the past, not because the Board of Trade would not endeavour to carry on the work in a satisfactory manner, but rather because it possesses no adequate machinery for the purpose, and has had no experience in this particular direction. The lecturer remarks: "That merchant-ships, especially steamers, having an Admiralty chart of the coast on board, rarely trouble to use the lead so long as they are able to fix their position by the land." My official connection with the Wreck Court has shown me that many strandings are due to the neglect of the lead when the weather is too thick to fix the position of the vessel by sight or by any other means. According to my experience, the accuracy of our charts is most satisfactory. It is true that upon one occasion, when passing through Banka Straits, in August, 1883, I discovered a considerable difference between the soundings shown on the Admiralty chart and those given me by the leadsman. However, when I add that the particular day in question was the date of the great earthquake in the Straits of Sunda, when the whole world appeared to be splitting up and coming to an end, the discrepancy may be readily accounted for without in any way impugning the work of the surveyors. Among the unsuspected dangers discovered in much frequented waters by the simple process of ships striking upon them, may be mentioned the Avocet rock, formed of coral and with only fifteen feet of water over it, situated some eighteen miles north of Jebel Zukur, in the Red Sea, which obstruction caused the loss of the

steam-ships "Avocet" and "Teddington" in 1887, and was re-discovered, after much difficulty, by H.M.S. "Stork" in 1888. Is it not possible—and I throw this out more as a suggestion than a probability—that in connection with some of these rocks an alteration may have taken place in the formation of the bottom? Coming to the concluding paragraph of the paper, the lecturer speaks of underwriters probably making it a condition of insurance that vessels should navigate in certain defined "swept" tracts. At the first blush, it would seem that underwriters have a special interest in encouraging, and indeed compelling, the adoption of any means calculated to minimise the chances of maritime disasters; but there is another side to the argument. If we were to succeed in abolishing all maritime risks to-morrow, the occupation of underwriters would also be gone—a prospect which those gentlemen could not be expected to view with absolute equanimity. A certain number of casualties is necessary to their existence, and it must be remembered that the greater is the risk the larger is the premium, and *vice versâ*.

Lieutenant H. T. A. Bosanquet, R.N., in reply, said:—I am very sorry that Lieutenant Helby is not here to-day to defend his own paper; but I should like to make a few remarks on the criticisms which have been made. The Hydrographer said that provided the scale of the chart is sufficiently large it is highly probable that most of the dangers will be found. When the Hamoaze, Plymouth, was being sounded in 1894 on a scale of 14 inches to a mile, a single shoal sounding was obtained on the edge of the Rubble Bank, almost exactly on the leading mark. As there was a lop on at the time, the officer surveying considered it might be a false cast; he nevertheless ran a number of lines of soundings in the neighbourhood about 35 feet apart, without finding any further indication of shoal water. It was not until some time later, when the Rubble Bank was being deepened, that a dredger's cable got foul of a rock at the same spot, with only 28 feet of water on it. The top of this rock was only 2 feet square, and the diver who found it could only stand on it with care. It was in fact a typical pinnacle rock, and it was the purest chance that the lead had once alighted on it.

Rear-Admiral Moore:—He had an indication of it.

Lieutenant Bosanquet:—But he was not able to find it, and it was taken off the chart.

Rear-Admiral Moore:—I submit that that was an error of judgment on the part of the officer.

Lieutenant Bosanquet:—The otter sweep has been very much criticised. Lieutenant Helby only put that forward as a suggestion. His otter sweep has not been tried, but he suggests that experiments might be made with something on similar lines. There is a very great difference between the old type of deep-sea lead and Thompson's sounding machine, and if some of our inventors—Lord Kelvin, for instance—would turn their attention to the system of sweeping, some sweep might be devised which would be really practical. Captain Maxwell referred to the time taken when sweeping. That, of course, is a very grave objection; but if the steam-boats of our fleets in some of our largely used harbours were to carry out regular and systematic sweeping, a good deal might be done in that way. Lieutenant Helby has furnished me with the case of the Channel Fleet which

went quite recently to Loch Aber in Scotland, where Lord Charles Beresford's flag-ship very nearly ran on an uncharted rock, and it was only through the captain of a private yacht, who called on the Admiral and pointed it out after the fleet had anchored, that he knew of its existence. The steam-boats might have swept here with advantage. Commander Caborne has mentioned the alteration of the formation of the bottom; that may be, but it certainly does not bear upon the case of the coral reefs of *dead* coral. For instance, the "Duke of Buckingham" sank on the Pearn Reef, which is of dead coral and unalterable. There must be many such in steamer tracks which have not yet been found, and which only sweeping can find.

The CHAIRMAN (Rear-Admiral Sir W. J. Wharton, K.C.B., F.R.S.):—I am sure we are all deeply obliged to Lieutenant Helby for having brought this subject forward. We have had some most interesting remarks made by officers who have very great experience in the matter, and therefore what they have said is very valuable. The author has taken for his subject a question which, speaking broadly, is one of very great difficulty, namely, what is the best way to proceed with the survey of the depth under the water. In a place like this world of ours, which is so large, the progress of any complete marine survey must be slow. I was often asked when I was at the Admiralty when the hydrographic survey would be completed. I have always said: "Never; we have not done a millionth part of it yet." I do not know a harbour anywhere that is what I should call properly surveyed for modern requirements; that is to say, to allow a vessel to go within a few yards of the depth shown as safe for her, if she can be navigated so closely, with absolute certainty that she will not strike. That is the ideal. It is not so much our ideal as surveyors', because we know that vessels cannot be navigated to that degree of nicety; but it is the ideal of our brother seamen who, having fast steamers, like to cut the corners, as everybody else in this world does. When I was Hydrographer I used to feel a very great difficulty in settling what the scale of the different surveys should be, because, as Captain Field said, it all depends upon the scale of survey whether your chart can be considered as accurate or not, with regard to the chances or not of having a rock left out of it. I do not know anything more difficult to settle. Generally speaking, it is the very last place in the world that you would expect a ship to want to go that ships, especially His Majesty's ships, have to go. A case in point occurred the other day, which the lecturer referred to, in the grounding of the "Leviathan." She went into a perfectly open bay in the vicinity of Wei-Hai-Wei—quite a proper place for temporary anchorage. The survey, however, had been done under my orders, on a scale of one inch to the mile, in which it is absolutely impossible to make certain that a rock is not left undetected; but at the same time, if I had doubled the scale, or made it a 3-inch scale, the survey of that open coast, instead of taking three years, which it is taking, would have taken ten or eleven. One has to take all those points of view into consideration, and endeavour to arrive at an opinion as to how the requirements of navigation are best served. You must take a certain amount of risk, as you have to do in all things, and, as Captain Field says, I think some surveys as at present on small scales will probably continue. I have often considered whether it would be in any way possible to warn sailors by placing something upon each individual chart as to what the scale of original survey was, and the way in which the published sheet is compiled; but I always had to give that up. There

are so many charts made up of different surveys, and if you put it on one chart you would have to put it on all, so that it is a thing you cannot do. The only thing for navigators to do is to be careful, and not to cut corners too close, as they often do. But that is not so much the point as the question of making a correct survey, and not leaving anything undetected behind. As Captain Field says, I am sure that if anything in the way of a really efficient plan of rapid, effectual sweeping could be devised, he would be very glad to try it. It is possible that something may be done with a combination of the otter trawl and the James' sentry, but I see a great many difficulties connected with it. Lieutenant Helby refers in his paper, I notice, to expecting the ship to sweep. It is not so much the ship, however. You do not want a machine for a ship but for a boat to sweep with, because where there is a swell and a tide it is very seldom that a rock is left undetected, except such rocks as the Quetta, or the Avocet, which are a long way from the land, in broad channels with little sea. No device whatever could ever have detected the Avocet, which is out of sight of land, and certainly no one would have been justified in sweeping the whole of the Red Sea. You could not do it. The rocks that are undetected generally are rocks in close harbours, which, in the olden days, were not dangerous because big ships did not go in to them; which never show by swell, because there is no swell; and of which the fishermen as a rule know nothing at all. In all the rocks found in the last eight or nine years in the Scottish lochs, I do not think in any case the fishermen were aware of them. As a rule the fishermen do not know such rocks. I myself the year before last was up in one of the Scotch lochs that had been recently surveyed; I was on my holidays and was out fishing with my children. I said to the boatman: "Let us go now to the rock off the point there." He replied: "There is no rock there; I have been here all my life and my father before me, and my grandfather before him, and we have always fished there, and I know there is not a rock." I said: "I will take you to the rock, and show you it," and I did so. It was a very dangerous rock, and yet they knew nothing about it at all, so that you cannot trust fishermen in such a case as that. I would remind Admiral Moore, in reply to what he said as to fishermen being rewarded for pointing out dangerous rocks, that that is already provided for.

Rear-Admiral MOORE:—I know that the order has been given; but looking back upon my own career, I have not taken enough trouble to go round to all the fishermen at all the different places to make certain that they know about it.

The CHAIRMAN:—There was no discouraging giving money to fishermen; in fact I have been sat upon by the Treasury for paying fishermen. They wanted to know upon what authority I paid away the money, but I was able to rebutt the suggestion that I had wasted it.

Captain MAXWELL:—It was through paying some money to a fisherman that we found that rock off the coast of Newfoundland.

The CHAIRMAN:—That is rather an interesting case which Captain Maxwell has mentioned. It was stated that there was a rock 22½ miles off the coast of Newfoundland, south of Cape Race, right in the track of all steamers coming to the St. Lawrence. It had been searched for two or three times, and could not be found; but it was suggested that some of the fishermen knew something about it, and Captain Maxwell was directed

to go and see the fishermen at the nearest bays. At last he found a man who, with great unwillingness, confessed that he knew where the rock was, and he took Captain Maxwell out and showed it to him. It appeared that this rock, out in the middle of the sea, was a capital place for fish, and the man wanted to keep the secret to himself so that the other fishing boats could not fish there. When the other boats went away he used to go to this place. He knew it by certain bearing marks from the land, and he always made a good haul. He was discontented because we only gave him £20. That was a case in which a fisherman required a great deal of pressing in order to get any information from him. Then Commander Caborne suggested that the bottom might move sometimes. I think that when the rocks come up in that sort of way they give you plenty of notice; they come up amid fire and smoke, and everybody knows about it.

Commander CABORNE :—That is so as a rule, but I thought there might be some unknown movements sometimes.

The CHAIRMAN :—I do not think so. Such a thing has never been known in nature yet. I am sure you will all agree with me in according a very hearty vote of thanks to Lieutenant Helby for his paper.

Admiral Sir NATHANIEL BOWDEN-SMITH, K.C.B. : — It is now my pleasant duty to propose a vote of thanks to Sir William Wharton for taking the Chair this afternoon. Before I do so I want to utter a word of warning to Lieutenant Helby with regard to a certain shore danger, in return for the dangers that he has shown us to exist at sea. He warned sailors that they should not put too implicit confidence in charts, adding that some seamen expected the charts to be as perfect and as reliable as a Bradshaw's Guide. I would observe that Bradshaw's Guide is not always reliable, and if in making a long trip cross country he places too much confidence in it, he will some day find himself stranded in an out-of-the-way place, at some country junction without bed or supper. With regard to Admiral Moore's remark, that we should have to spend ten times as much as we do now on surveying if a more thorough survey were carried out, I can only say that with the income-tax at 1s. in the £, I am afraid we cannot hope that the world will ever be thoroughly surveyed if it is to be done mainly by British vessels. I am sure you will join with me in according a hearty vote of thanks to Sir William Wharton for occupying the Chair

THE
ROYAL MILITARY COLLEGE OF CANADA.

By Colonel R. N. R. READE, p.s.c., h.p., King's Shropshire Light Infantry, and Commandant of the R.M.C. of Canada.

THE Royal Military College of Canada was founded in 1876 by the Canadian Government, the late Lieut.-General (then Colonel) E. Hewett, C.M.G., R.E., being its organiser and first commandant.

It is situated on a spit of land opposite Kingston, where the river St. Lawrence issues from the eastern end of Lake Ontario. In former days this spit was used by the Royal Navy as a dockyard and naval base; and the dormitory building of the present college still bears the nick-name of the "Stone Frigate," having been built as part of the old naval barracks.

The principal college buildings lie on two sides of the parade ground. On the north side is the main educational block, containing the class-rooms, library, staff offices, reading, recreation, and billiard-rooms; also the mess-room and mess kitchen. Adjoining the educational block is the hospital.

On the east side of the parade is the dormitory building, before mentioned. It can accommodate 100 cadets, all except the junior class having separate rooms. In the basement is a well-equipped carpenter's workshop.

In line with the dormitory and connected with it by a covered passage stands the gymnasium, built two years ago, and furnished with all the latest improvements. Beneath it are bowling and shooting galleries, and a plunge bath is being built.

Amongst other buildings are two good sized gun-drill sheds, military engineering modelling sheds, and pontoon sheds, a boat-house, a bathing shed, and an electric power-house, for all the college buildings are lighted by electric light.

Close to the parade ground are lawn tennis courts, a cricket and football ground, a running track, an open rink, and last, but not least, a rifle range for distances up to 600 yards.

Quarters for the military officers of the Staff, also cottages for the servants, are provided in the college grounds, so that the whole establishment is concentrated in a convenient manner.

The Canadian Government, however, contemplate the erection of additional buildings, and it is hoped that shortly a riding school with stables for the horses and quarters for the men of the riding establishment will be built in the grounds, as well as a covered rink large enough for the favourite Canadian game of hockey on the ice.

Originally organised on the lines of Woolwich and Sandhurst in the mother country, and of West Point Military Academy in the United States, the Royal Military College of Canada is intended to perform similar functions, while at the same time it has a further

object. For, to a thorough military education, is added a grounding in civil engineering and surveying, so as to fit a graduate either to enter the Army or to take his place in two of the most important civil professions in the Dominion.

In this way the founders of the college hoped to create a body of graduates, trained on a military basis, who, adopting the Army as a profession, should help to officer the Permanent Militia, or who, entering civil life, should be available to serve in the Active Militia of the country.

After graduating, a cadet passes at once into the Reserve of Officers of the Canadian Militia, and receives no further military training. It is, however, open to him to join the Active Militia; and he is eligible up to the age of 25 for a commission in the Permanent Militia, should he receive a nomination from the Minister of Militia.

In addition, seven commissions (viz., 1 Royal Artillery; 1 Royal Engineers; 1 infantry; 1 cavalry or infantry; 2 Army Service Corps; 1 Indian Army) in the Imperial Service are offered annually to the graduating class. Cadets of this class are given their choice of corps according to the order of merit in which they pass out of the college, provided they pass out in the first fourteen and are recommended as suitable by the commandant.

Candidates for entrance to the college, who must be British subjects resident in Canada and between the ages of 16 and 20, have to pass an open competitive examination and be medically fit. This entrance examination includes as compulsory subjects, mathematics, English history and geography, French, and chemistry; and as voluntary subjects, Latin, geometrical and freehand drawing.

The course, which lasts three years, is to English ideas an exceedingly cheap one. Its cost is £60 for the first year, and £50 for each subsequent year — £160 in all, and this covers tuition, board, lodging, medical attendance, books, and uniform. The balance between the fees paid and the cost of maintaining the college is about £10,000 a year, a charge borne by the Canadian Government.

Having passed the entrance examination (and about 50 applicants compete yearly for 35 vacancies), the successful candidate joins the college as a gentleman cadet, and is duly enlisted into the Canadian Militia for the three years of the college course. He is now treated as a Regular soldier, and is posted to a company; for the cadets are organised as a battalion, the companies being commanded by the military professors, and the non-commissioned ranks being filled from the cadets themselves. A specially selected cadet is made senior non-commissioned officer or battalion sergeant-major, and this distinction, carrying as it does certain privileges, is highly prized.

The uniform, which is always worn during term time, is similar to that of the Sandhurst cadets. The full dress consists of a white helmet, red tunic, and blue trousers; the undress of a gold-laced forage cap, blue serge patrol jacket and trousers, or else Bedford cord breeches and blue putties for riding. In winter, grey fur caps and mitts are taken into wear, and for snow-shoe drill, mocassins, red stockings, and red comforters complete a very smart and serviceable kit.

There are at present 96 cadets at the college, and the question of affording accommodation for a larger number is under consideration.

The following table shows the subjects taught during the college course:—

First Year. (Third Class.)	Second Year. (Second Class.)	Third Year. (First Class.)
Military Subjects (Theoretical).		
Military Engineering.	Military Engineering.	Military Engineering.
Military Topography.	Military Topography.	Reconnaissance.
Artillery.	Artillery.	
	Tactics.	
	Military Law and Administration.	
Military Subjects (Practical Drills and Exercises).		
Infantry drill.	Infantry drill.	Infantry drill.
Artillery	Drill (both Garrison and Field).	
Rifle practice (recruits' course).	Rifle practice (trained soldiers' course)	Rifle practice (trained soldiers' course)
Revolver practice.	Revolver practice.	Revolver practice.
Gymnastics.	Gymnastics.	Gymnastics.
Swimming	Signalling.	Riding.
Carpenters' workshops.	Carpenters' workshops	
Civil Subjects.		
Mathematics.	Mathematics.	Civil Engineering
Geometrical Drawing.	Descriptive Geometry.	Physics and Chemistry.
English.	Surveying.	Surveying.
French.	French.	

In summer the cadets usually go into camp for gun practice, when they are formed for the purpose as a field battery, the battery, section commanders, etc., being all furnished by the cadets themselves.

It will be seen from the above description that the cadet's day is fully occupied both in and out of doors.

At the end of each year an examination is held, and those not up to a certain standard are weeded out. Consequently only about 60 per cent. of each batch remain to graduate in their final year. This may seem a hardship, but the time is short, and much has to be done in it; while, as a result, a graduate of the college is looked on as being up to a high standard.

The commandant and military professors (four in number) are officers on the active list of the Imperial Army, lent by the British Government for five years. Each military professor teaches both a theoretical and practical military subject, so that the cadet may better realise that the indoor lecturer is at the same time a practical military officer. Staff courses, staff rides, and garrison classes for the officers of the Canadian Militia are also conducted by the military professors of the college.

Qualified non-commissioned officers of the Imperial Army further assist in the instruction in military subjects.

The staff for civil subjects consists of seven civilian professors, selected for their professional ability.

Finally, an officer of the Permanent Militia performs the duties of staff adjutant, paymaster, and quartermaster, and holds the appointment for five years.

Of the 600 cadets who have passed through the college since it opened, over 160 have received commissions in the Imperial Army, and have well upheld the honour of the R.M.C. of Canada. For there has scarcely been an expedition in the last 25 years in which ex-cadets have not taken a distinguished part; and they are to be found in all ranks of the Service, from brigadier-general (H. P. Leader, 6th Carabineers) downwards.

About 20 ex-cadets have so far entered the Permanent Militia of the Dominion, and have done well in it, several having served with distinction in the Canadian contingents in South Africa.

The bulk of the graduates, however, enter the professions of civil engineering and surveying, when, except those who go into the Active Militia, they remain in the Reserve of Officers, available only in case of emergency.

That so few should make choice of the Permanent Militia as a profession is, of course, contrary to the intentions of the founders of the college; but the majority of the cadets have little private means, and the emoluments and opening for advancement in the Permanent Militia have so far failed to compete successfully in their eyes with the counter-attractions of the civil professions in a flourishing and growing country like Canada.

Various suggestions have been made as to the best means of getting ex-cadets to serve in the Militia, either Permanent or Active.

Some have proposed that each year so many commissions in the Permanent Militia should be offered to the graduating class (as is done in the case of Imperial commissions), the cadets being given their choice of corps according to the order of merit in which they pass out of the college, and a substantial bonus being paid them as an outfit allowance.

Others have advocated the compulsory service of cadets for three trainings in the Active Militia on leaving the college.

Whether these proposals would have the desired effect, if carried out, it is hard to say. Still, as things stand, though the R.M.C. graduates may not be now utilised as fully as they might be in the national force, yet they remain available in the Reserve of Officers in case of need; while the fact that many came forward freely from civil life to serve in the Canadian contingents for the South African War shows that they form a latent military power in the Dominion which can always be counted on.

NOTE.—Since the above was written, the Canadian Government has assumed charge of Halifax and Esquimalt, and has in consequence increased the strength of the Permanent Militia, offering at the same time further inducements to officers to join it.

In these arrangements, the cadets of the R.M.C. have not been forgotten, and in future, three commissions in the Permanent Militia will be offered annually to the graduating class, choice of corps, etc., being granted according to the order of merit in which the candidates pass out of the College. Whilst, as a special case this year, extra commissions have been offered to both the graduating and the 2nd classes.

The results have been very gratifying; for, this month, six cadets of the graduating class and eight of the 2nd class have in this manner obtained commissions in the Permanent Forces of Canada.—*R.N.R.R.*

June, 1905.

INDIAN SILAHDAR CAVALRY.

By Lieutenant H. J. WALLIS, XX. Deccan Horse.

LEST the reader commence his perusal with a mind puzzled by the title and with no anticipatory insight into the purport of this article, it should be explained that *silah* means in Persian a weapon or arm, while *dar* is the agentive termination, the whole meaning "one with weapons or arms."

To appreciate how the term comes by obscure metonymy to have its present application, we must consider the feudal idea that has prevailed in every community desirous of maintaining peace within its own limits, and depending for its homogeneity on armed individual effort. In those days everybody maintained—for his own safety he *had* to maintain—some form of weapon, and the wealthier of course had their horse or horses. At the call of necessity or ambition each man gathered round the standard of his particular *gens*, armed and equipped. Of course, if it was a case of the cause heroic, where the defence of country and of home and hearth was in itself the only guerdon, there was no case for the wages of military service; but it can be very readily adduced that from the defence of the land and the home within its marches to the aggressive attack upon him or anyone that dwelt without is an easy step. Those so ambitious would naturally call out the ready armed man, "the silahdar," and with promise of pay, of loot, and the replacement of accoutrements and horse lost in the emprise would induce men to fight beneath their standards.

The various States and Nations of what in England is known as the peninsula of Hindostan, were in the beginning and, outside the limits of British India, are to this day, intensely feudal. Distances are great and often beyond achievement by human self-locomotion, so that every man with any claim to standing or substance owned a horse or pony. Hence we can see the explanation of the large proportion of horsemen or cavalry which has distinguished the composition of armies in India from the days of Alexander and the Rajah Porus to the time when, under Clive and Wellesley, we fought the mounted hordes of Maratha and Pindari leaders. The distances in India, as I have remarked, are great, hence we may infer that a man who could bring his own horse or pony when he enlisted either as a volunteer or a mercenary was thrice acceptable. Thus the term *silahdar* came to embrace in its meaning more than an armed man, and by metonymy began to be exclusively used for the mounted soldier of feudalism.

Precisely similar in kind, if a little broader in degree, the Indian Silahdar Cavalry preserves in itself this last relic of feudal organisation. All over the country, service under the British *Raj* as a horse soldier is looked upon as an honour and passport to social distinction; for no matter if the officers' badges of rank, which every *sowar* or

trooper (like the French soldier and his bâton of the Marshals of France) carries in his saddle-bags, be never worn, still there is a moral or psychic something which allocates to the Indian trooper a pride of place which ranks him immeasurably superior to his erstwhile compeers.

Drawn mainly from the sons of the soil, the backbone of the Indian peoples, the *zamindar*, or landowner and farmer class, the recruit, very "jungli" or raw, proposes for enlistment. He must nowadays not bring his own weapons and horse—the march of stern and pitiless science in war cannot allow any but the most modern weapons and the best horses—but must bring with him the cash equivalent of his mount and share of baggage pony, which amount is then paid into the funds of the regiment he proposes to join. He is then allotted a horse and half a share in a baggage pony or mule, and is debited the value of the saddlery, uniform, and necessary kit, which he is usually glad to take over from the man whose vacancy on becoming non-effective he is filling. The share in the economy and organisation of the regiment, which he has thus purchased and which is commonly termed the *assami*, the trooper will have to maintain by monthly subscriptions from his pay and horse allowance, which subscriptions serve as a guarantee against the death of his horse and of deficiencies in and inevitable deterioration of kit. All that Government does for him is to supply bandolier, rifle, ammunition, and the cost of the feed of his horse and half share of a transport animal; and the tremendous business of maintaining, equipping, and mounting regiments of four squadrons of six hundred and twenty-five sabres or lances as the case may be then devolves upon the man and his British and native officers.

There is another source of recruiting, and that is from among the sons of the men and native officers of the regiment who are allowed within a certain percentage to have their families in the lines. Many commanding officers prefer to enlist these "line boys," as they are called, for having been brought up all their lives in the regiment, they are naturally imbued with regimental traditions, and are familiar of course with the methods of the discipline which they are sensible of as being inseparable from the control of the body militant. They know their drill, are accustomed to horses, and can of course all ride from their babyhood. Familiarity with the life of the trooper only seems to redouble their keenness for military service, and it is a fact that these youngsters will actually set themselves to acquiring some feature of the profession of arms, such as signalling, farriery, etc., and will stump round with the real recruits' drill by the hour, if by so doing they think they will be able to induce a commanding officer to enlist them.

That the system is a success is borne out by the fact that regiments on the silahdar system have been flourishing now for many decades, some indeed from Southern India for over a century, and a high authority has said that for its cost to Government it is the most efficient arm in the world.

It is true that of the thirty-eight regiments of Indian Cavalry there are three "Regular" regiments as opposed in contradistinction to the thirty-five Irregular, *i.e.*, silahdar regiments. These are organised and administered on usual lines, the entire cost of their maintenance being a charge against Government—a very heavy charge indeed, and as compared with regiments on the silahdar system

probably as two to one. They have no transport, and in time of war would be dependent on the Commissariat authorities' efforts towards the conveyance of their effects, and so the maintenance of their efficiency, in a campaign.

Of the sound financial aspect of this military organisation there can be no question; and the system is really a method of insurance as applied to every need and want of the regiment, and the trooper that is not fulfilled by Government. A silahdar regiment is thus entirely self-supporting, and must look to none and to nowhere but itself for the maintenance of its remounting, stabling, barracks, both of men and followers, for a great part of its conservancy and sanitation; troop servants, such as grooms, washermen, cooks, tailors, and saddlers, and also many other objects of expense relative to its efficiency, life, and well-being.

It may be queried that though the man subscribes for the maintenance of what he has got, how about the renewals of horse and pony flesh, uniform, etc., which are all of them things perishable? This is all met by the extent of the man's subscriptions being calculated from years of experience, to not only cover all that, but to go just a little way beyond; the moiety remaining forming the insurance effected by the regiment against the depreciation of its live and dead stock; and regiments that are run on sound financial lines have very large funds, partly built up by these means, and established by the whole-hearted efforts of the British and Native officers, whose night and day are devoted to the augmentation and promotion of their regiment's financial prosperity, and partly by utilising every little opportunity that may offer for adding to the regimental funds, such as, for instance, the training and sale of horses, and the exploitation of the various regimental institutions (like the shoeing-forge, workshops, etc.), among civilians and other officers.

The soundest aspect of the whole system has not yet been touched upon, and that is, that when a man goes to pension, retires, or for any reason becomes non-effective, he receives from the incoming recruit, the value of his paid-up share in the regiment, which he, as a recruit, had purchased at the beginning of his service, and now sells out as well as his kit and accoutrements, which are priced at their market value, and handed over to the new-comer. This return of the primary deposit is rendered possible by the above-mentioned moieties forming insurance premia that are remaining from a man's regimental subscriptions, and are, of course, nothing more, looked at from another point of view, than deductions on account of deferred pay.

The amount a man takes away with him as a result of the sale of his interest in the regiment, and of his uniform and accoutrements, varies with different regiments; but it is regarded as sounder finance for a man to pay a long price on enlistment—which, in some regiments, he is allowed to do by a primary deposit and consecutive instalments—for in that case he has, at the end of his twenty-one or thirty-two years' service, laid by a greater provision to enable him to set up in civilian employment, or add to his land or property, by means of the respectable sum of Rs 500/- to Rs 600/- (£35—£40), than in the case of him from those regiments, the value of whose share or *assami* is only some Rs 250 to Rs. 300 (£17—£20).

Of latter years Government has initiated a scheme of practical philanthropy, and has given the prior claim on this to men of the

Native Army. This is the husbanding of the waters of the great rivers, their diversion into canals, and the planting of colonies by inducements, to settle there in the form of free grants of land along their banks, to deserving applicants; just as in years gone by, Rome rewarded her legionaries.

In this way military colonies are flourishing in many parts of Northern India; and combined with the fostering of the fighting races, Government encourages horse and mule breeding by allotting extra land to men of the cavalry regiments who are willing to maintain a brood mare, which can be served free of cost by Government horse and donkey stallions.

The traditions, the proud achievements, the merits of the Indian silahdar cavalry, are, in themselves, a plea for encouragement and approbation; and the feudal devotion of the men to their British and Native officers, and of their officers to their men, and all that concerns them and their welfare, must constitute one of the surest and safest bulwarks that the Empire has founded for her defence and her protection; for these regiments, self-contained and self-supporting are fit and ready to go anywhere and do anything.

NAVAL NOTES.

HOME. — The following are the principal appointments which have been made: Rear-Admirals — A. C. Corry to be Superintendent of Chatham Dockyard; Sir A. B. Milne, Bart., K.C.V.O., to be Second-in-Command of Atlantic Fleet. Captains — C. R. Keppel, C.B., D.S.O., to "Victoria and Albert," as Commodore 2nd Class, in charge of H.M. Yachts; H. P. Williams to "Tamar," as Commodore 2nd Class, in charge of Hong Kong; E. S. Alexander-Sinclair to "Racer," and for R.N. College, Osborne; H. H. Tothill to "Diamond"; C. F. Lambert to "Sapphire"; C. D. Granville to "King Alfred"; C. J. Eyres to "Spartiate"; R. G. Tupper to "Prince of Wales"; F. G. Eyre to "Venus"; E. G. Barton to "Royal Oak"; J. F. Parry to "Egeria"; A. G. Moore to "Royal Arthur"; A. G. Tate to "Hindustan"; A. J. Henniker-Hughan to "Venerable"; J. L. Marx, M.V.O., to "Dominion"; D. R. Nicholson to "Hyacinth"; A. H. Hayes-Sadler to "Resolution"; H. C. Reynolds to "Vengeance"; F. S. Pelham to "Albion"; R. H. J. Stewart to "Monmouth"; H. A. Warren, M.V.O., to "Jupiter." Commanders — M. H. Hodges to "Sappho"; G. A. Hardinge to "Æolus"; F. K. Gibbons to "Boscawen III."; E. E. Lacy to "Emerald"; A. C. Smith to "Foresight"; W. H. Cowan, D.S.O., M.V.O., to "Skirmisher."

Admiral Sir G. Noel, K.C.B., K.C.M.G., is to transfer his flag to the first-class cruiser "Diadem," which is to become his flag-ship in place of the first-class battle-ship "Glory," the latter having been ordered home. The remaining battle-ships from the China station, viz., the "Albion" (flying the flag of Rear-Admiral the Hon. A. Curzon-Howe, C.V.O., C.B., C.M.G.), "Ocean," "Vengeance," and "Centurion," arrived at Plymouth on the 2nd inst.; the "Albion" is to pay off at Chatham, and the "Ocean" at Devonport, while the "Vengeance" and "Centurion" have proceeded to Portsmouth to give leave to their crews. Vice-Admiral Sir D. H. Bosanquet, K.C.B., transferred his flag at Portsmouth, on the 19th ult., from the "Ariadne" to the "Royal Arthur." Rear-Admiral G. Neville, M.V.O., hoisted his flag at Portsmouth, on the 6th ult., on board the "Good Hope," in command of the First Cruiser Squadron, in succession to Rear-Admiral E. Poë, C.V.O.

The new first-class battle-ship "New Zealand" commissioned on the 11th ult. at Devonport for the Atlantic Fleet, and she left Plymouth on the 27th ult. for Gibraltar; she takes the place in the Atlantic Fleet of the "Prince George," which ship is to relieve the "Hannibal" in the Channel Fleet. The first-class battle-ship "Venerable," flag-ship of Vice-Admiral Sir H. Grenfell, K.C.B., C.M.G., Second-in-Command of the Mediterranean Fleet, arrived at Sheerness on the 23rd ult.; she paid off at Chatham on the 31st ult., and re-commissioned on the 1st inst. for a further term of service in the Mediterranean; she left Chatham on the 9th inst. for her destination.

The first-class armoured cruiser "Antrim" commissioned on the 15th ult. at Chatham for the First Cruiser Squadron. The first-class cruiser "Royal Arthur" commissioned on the 18th ult. at Portsmouth for service as flag-ship of the Fourth Cruiser Squadron. The first-class cruiser

"Amphitrite" arrived at Plymouth on the 20th ult. from China, and proceeded to Chatham, where she paid off on the 11th inst.

The second-class cruiser "Thetis," last from China, paid off on the 12th ult. at Chatham.

The new scout "Sentinel" left Devonport on the 14th ult. for the Mediterranean. A sister-ship, the "Pathfinder," commissioned on the 18th ult. for service with the Atlantic Fleet.

The Visit of the Atlantic Fleet to Brest.—The naval event of the month has been the visit of the Atlantic Fleet, under Vice-Admiral Sir W. H. May, K.C.V.O., to Brest and the very hospitable reception accorded to all ranks in the fleet by the French authorities, Navy, and the population of Brest, as well as in Paris. The ships composing the Atlantic Fleet were:—

First-class battle-ships—"King Edward VII." (flag-ship of Vice-Admiral Commanding), "Victorious" (flag-ship of Rear-Admiral Bridgeman), "Magnificent," "Mars," "Illustrious," "Commonwealth," "Majestic," "Prince George."
Second-class cruiser—"Doris."
Third-class cruiser—"Amethyst."
Repair-ship—"Assistance."

The French Fleet assembled to greet the English consisted of the French Northern Squadron, under the command of Vice-Admiral Caillard, and certain other ships on special service:—

The Northern Squadron.

First-class battle-ships—"Masséna" (flag-ship of Commander-in-Chief), "Jauréguiberry," "Carnot."
Coast-defence battle-ships—"Bouvines" (flag-ship of Rear-Admiral Leygue), "Amiral Tréhouart," "Henri IV."

Cruiser Division.

First-class armoured cruisers—"Gloire" (flag-ship of Rear-Admiral Puech), "Amiral Aube," "Condé."
Third-class cruiser—"Forbin."
Destroyers—"Arquebuse," "Bélier," "Bombarde," "Flamberge," "Cassini," "Baliste."

The other ships present were:—
Cadet training-ships—"Borda," "Bretagne," "Saône."
First-class armoured cruiser—"Léon Gambetta" (on trials).
Destroyers—"Escopette," "Fauconneau."
Despatch-vessel—"Salve."

The "Majestic," "Commonwealth," "Prince George," and "Assistance" were moored in the outer harbour, the remaining ships inside the breakwater in the inner harbour; the English flag-ships being placed between the French flag-ships "Masséna," "Gloire," and "Bouvines."

The Atlantic Fleet left Brest again on the afternoon of the 17th July for Gibraltar.

Steam Trials.—Three more of the improved County class of armoured cruisers have successfully completed their trials, viz., the "Antrim," "Devonshire," and "Roxburgh." The first vessel of the new type tried was the "Carnarvon"; her engines were designed to develop 21,000-I.H.P.,

giving a speed of 22¼ knots, with 130 revolutions; but at the trial the actual H.P. developed was 21,489, which, with 142 revolutions, gave a mean speed of 23·3 knots.

The following are the tabulated results of the trials:—

TABLE I.—*Results of Measured-Mile Speed Trials of H.M.S. "Antrim."*

Number of Runs.	Revolutions per Minute.		I.H.P.		Total.	Speed.
	Starboard.	Port.	Starboard.	Port.		
						knots
Four Runs on 14,000-I.H.P. Thirty Hours' Trial.						
Mean of Means ..	128·7	129·4	—	—	14,643	21·33
Four Runs on Full-Power Eight Hours' Trial.						
Mean of Means ...	143·8	142·6	—	—	21,606	23·02.

TABLE II.—*Steam Trials of H.M.S. "Antrim."*

Duration of trial ...	30 hours		30 hours.		8 hours	
Nature of trial... ...	One-fifth power coal consumption.		14,000-I.H.P.		Full-power.	
	Forward.	Aft.	Forward.	Aft.	Forward.	Aft.
Draught of water ...	24 ft. 8 in.	25 ft. 7½ in.	24 ft. 7¼ in.	25 ft. 6⅜ in.	24 ft. 7 in.	25 ft. 7 in.
Steam pressure in boilers	161 lbs.		186 lbs.		185 lbs.	
	Starboard.	Port.	Starboard.	Port	Starboard.	Port.
Revolutions	88·4 in.	87·7 in.	127·8 in.	127·4 in.	142·6	142·6
Total I.H.P. ...	2,350	2,318	7,427	7,201	10,627	10,977
Grand total ...	4,668		14,628		21,604	
Coal consumption per I.H.P. per hour ...	2·06 lbs.		1·95 lbs.		2·26 lbs.	
Speed of ship (average throughout trial) ...	—		21·1 knots.		22·92 knots.	
Speed of ship (mean of 4 runs on measured mile)	—		21·33 „		23·02 „	

TABLE III.—*Results of Steam Trials of H.M. Armoured Cruiser "Devonshire."*

Date of trial	March 13 and 14, 1905.		March 22 and 23, 1905.		April 7, 1905.	
Nature of trial... ...	30 hours' coal consumption at 4,500-I.H.P.		30 hours' coal consumption at 14,700-I.H.P.		8 hours' full-power trial.	
	Forward.	Aft.	Forward.	Aft.	Forward.	Aft.
Draught of water ...	24 ft. 6 in.	25 ft. 6 in.	24 ft. 6 in.	25 ft. 6 in	24 ft. 6 in.	25 ft. 6 in.
	Starboard.	Port.	Starboard.	Port.	Starboard.	Port
Revolutions per minute	83·8	83·4	126·7	126·8	139·55	140·45
Total I.H.P. ...	2,286	2,247	7,283	7,547	10,676	10·799
Grand total ...	4,533		14,830		21,475	
Speed (knots)	13·07 by bearings.		21 by log.		22·97 mean of 4 runs.	
Coal consumption per I.H.P per hour ..	2·05 lbs.		2·023 lbs.		1 79 lbs.	

The first trial of the "Roxburgh" at 4,500-I.H.P. was carried out on the run to Portsmouth from the Clyde; for a mean of 86·6 revolutions the power was 4,634-I.H.P., the coal consumption being 2·09 lbs. The 30 hours' trial at the prescribed power of 14,700-I.H.P. was carried out on the return to the Clyde from Portsmouth, and in the course of the trial four runs over the measured mile at Skelmorlie were carried out, the mean speed of these being 21·54 knots. The result for the 30 hours' run showed that for 127·4 revolutions the I.H.P. was 15,005, the coal consumption being 1·99 lbs. per I.H.P. per hour. At her eight hours' full-power trial, the contract required that on this run 21,000-H.P. should be indicated; the mean power on the eight hours' steaming was actually 21,857, which was got with the starboard engine making 143·1 revolutions and the port engine 144·2 revolutions. The steam pressure at the boiler was 204 lbs., while the coal consumption was 2·3 lbs. per horse-power-hour. Four runs were again made over the measured mile, the average speed being 23·63 knots, which is higher than in the preceding vessels of the class, so that a high propulsive efficiency must have been realised. Throughout the machinery worked very satisfactorily; the trials were conducted under the new war conditions.

The following is a table of comparison between the ships of the class which have already completed their trials:—

	I.H.P.	Speed.	Coal Consumption.	Boilers.
			lbs.	
"Carnarvon" ...	21,322	23·3	2·28	Niclausse.
"Devonshire" ...	21,475	22·97	1·79	——
"Antrim"	21,604	23·02	2·26	Yarrow.
"Roxburgh" ...	21,857	23·63	2·3	Durr.

—*Résumé from Engineering.*

France.—The following are the principal appointments which have been made: Vice-Admirals—C. A. L. Gigon to Command of the Squadron of the North; C. A. Mallarmé to be President of the Technical Committee of the Navy. Rear-Admiral—J. F. Krantz for service at Cherbourg. Capitaines de Vaisseau — E. J. Perrin to "Borda"; A. Guillon to "Brennus"; M. J. De la Croix de Castries to "Gaulois"; F. Moreau to "Kléber"; L. G. Martel to "Montcalm." Capitaine de Frégate—A. E. Boyer to "La Hire."—*Journal Officiel de la République Française.*

Rear-Admiral Jauréguiberry, in command of the Division of the Reserve of the Mediterranean Fleet, on board whose flag-ship, the "Brennus," Vice-Admiral Fournier has been flying his flag, as Admiralissimo during the manœuvres, has been acting as the Commander-in-Chief's Chief of Staff; he will be succeeded in command of the Reserve Division, at the conclusion of the manœuvres, by Rear-Admiral Germinet.

In the last No. of the Journal we gave a list of the large units composing the manœuvre fleet; the following is the composition of the mobilised torpedo flotillas, which are under the command of Capitaine de Frégate Lanevic:—

First Division.

Divisionaire-destroyer—"Pertuisane."

Torpilleurs de Haute Mer—"Aquilon," "Averne," "Argonaute," "Turco," "Flibustier," "Dauphin."

Second Division.

Divisionaire-destroyer—"Hallebarde."
First-class torpedo-boats—Nos. 219, 216, 225, 226, 203, 253.
Submarines—"Y," "Cigogne" (if sufficiently completed), "Grondin," "Anguille," "Perle," "Esturgeon," "Souffleur," "Dorade," "Bonite," "Thon," "Gymnote," "Gustave Zédé."

Loss of the "Farfadet."—The submarine "Farfadet," stationed at Biserta, foundered in the lake about 500 yards from the Arsenal at Sidi Abdallah, about 8.30 a.m. on the 6th ult., when exercising with an officer and sixteen men on board. The lieutenant in command, Ratier, and two men only were saved. It appears that the officer in command, having perceived at the moment when the vessel was about to descend that the skylight of the cupola closed badly, attempted to put it right by opening and shutting it with a slam, but before it was completely closed the water began to flood the cupola, and forced the door outwards. Lieutenant Ratier was thrown out, and in a few moments two other men also appeared on the surface. The submarine sank head foremost, and buried its nose deeply in the mud. Divers were immediately sent down, who ascertained that some of the crew were alive in the after part, and immediate steps were taken, under the personal superintendence of Rear-Admiral Aubert, to raise the vessel. Assistance was obtained from the German salvage-steamer "Berger Wilhelm," and the "Kébir," and steel hawsers and chains with some difficulty were passed round her, and by means of the 30-ton floating crane of the Hersent Company, by noon on the 7th the after part of the submarine was raised above the water. The men in the stern were found to be still alive, as they answered to signals, and the air was renewed through a small port hole, but unfortunately it was not possible to open the after hatch; a start was then made to tow the submarine slowly into shallow water, when the crane suddenly gave way, and the vessel sank below the surface again. Fresh hawsers were then passed round the vessel; at 5 p.m. the divers reported that they could get no answer to their signals from the imprisoned men, but the attempt to refloat the vessel failed, as her fore part was now firmly fixed in the mud which forms the bottom. It was necessary now to tunnel under the hull to pass the new hawsers—a work of considerable difficulty for the divers—and by this means two additional steel hawsers, one a 4½-inch and the other a 2¾-inch, were passed under her bottom. On the 12th, a 350-ton floating dock, which was used for docking the torpedo-vessels of the *défense-mobile*, was placed over the submarine and sunk to the required depth; the steel hawsers were secured to it, the dock then pumped out, and by this means the "Farfadet" was at last raised sufficiently to allow of her being brought into dock, which was effected on the morning of the 13th. Among those who perished on board the ill-fated "Farfadet" were Sub-Lieutenant Robin, the second-in-command, and the boatswain, Lesausse. It does not appear that the "Farfadet" has sustained much damage; the hull is almost intact, and so strong that it has hardly been marked by the heavy chains used in raising her; but the accumulators, motors and other parts of the machinery have been much damaged. The great difficulty experienced in raising her was due to the fact that the bottom where she sank is composed of a peculiarly tenacious kind of clay, which not only held her firmly, but would have sucked her down completely if a large chain had not been got round her at once—a precaution which was due to the foresight of Lieutenant Mandine, who has charge of the fixed mine defences at Biserta. The vessel is to be tem-

porarily repaired, and will then be brought back to Toulon. The "Farfadet" had a displacement of 185 tons, was 135 feet 7 inches long, with a beam of 9 feet 6 inches; she had a speed of 12·2 knots on the surface and 8 knots submerged. Her motive power was electric, worked by accumulators. She was laid down at Rochefort in 1899, and was sent to Biserta in 1903.

M. Lockroy on the New Building Programme.—In a series of letters to the *Temps*, M. Lockroy, late Minister of Marine and a well-known authority on naval matters, has been recently giving his views on the types of ships which ought to be laid down for the French Navy:—

"We have," he writes, "every description of ship in France—the richest collection in the world. We have small vessels; we have them of medium size; some have a fighting value, some have none; some can be utilised in some way or another, others are of no use whatever. We have not sufficient ships for our defence, and yet we have too many for our Budget. From the economic point of view, we are committing the blunder of wasting our money; from the fighting point, of frittering away our strength.

"We have already given up building coast-defence ships; that is something. We have also given up building small cruisers, which have neither speed, radius of action, guns nor armour, and whose principal defect is that they cannot cruise. But we still possess too many classes of ships, the number of which it would be to our interest to reduce. The more we approach perfect homogeneity, whether in ships or guns, the more will money be saved to the country and the strength of the fleet increased.

"France is not sufficiently rich to afford the luxury of too many types of ships. In this matter she must content herself with the indispensable. It is possible for England to multiply the characteristics of her ships, but she is not doing so any longer. For us to do so would spell disaster, both financial and fighting. It is this which must be impressed upon the authors of the new programme. We have already squadrons of battle-ships and other squadrons of armoured cruisers, when, if we go to the bottom of things, we are obliged to recognise that the battle-ship and the armoured cruiser, which are two different ships, are, however, when looked at closely, almost the same. They represent, that is to say, two aspects of the same problem, the two sides of an identical conception. The principle which has determined their definite system is the same in both; the disposition of their guns is the same. Every day their power and speed tend more and more to become equal. One can instance battle-ships which steam better than cruisers, and certain cruisers which are more powerful than battle-ships. The armoured cruiser 'Ernest Renan' will be of as much value as the 'Iéna,' and in England the armoured cruiser 'Minotaur,' and the 'California' in the United States, will prove redoubtable instruments of war. Why are some ships called armoured cruisers and others battle-ships? We know less and less. The two types tend to merge in each other. A naval programme ought to consecrate this evolution. If France continues to have squadrons of battle-ships and other squadrons of armoured cruisers, she will have, as she has to-day, two squadrons composed of dissimilar types, which will cost her dear, and each of which will be fatally too weak. It is necessary to start boldly on a new path of economic and fighting progress to realise that which has already been

realised by almost all the naval Powers, that which industry and science have rendered possible, and to construct a ship which will synthesize the battle-ship and the armoured cruiser, and which will be the 'fighting ship' of the future."

M. Lockroy proceeds to call attention to the question of the distribution of armour, and points out that for a long time past in French ships great attention has been devoted to the protection of the water-line with very thick armour to the neglect of the protection of the rest of the hull. "The thickness of this belt," says M. Lockroy, "has become with us a dogma. It is all a question of weights in a ship, and we have sacrificed to this thick belt so much speed, so much armament, or else so much coal and stores. The use of high explosives, however, has altered the condition of things, and it is now clear that ships pierced above the water-line can capsize and founder. We have built what M. Bertin has styled 'capsizable types'; and we are beginning to see now the necessity of armouring the hull of the ships above the water-line.

"Abroad they have gone to work much more boldly, and the history of *armouring* and *unarmouring* is instructive. From 1878 to 1890 all Navies did as we did, and contented themselves with a thick water-line belt. It was in the English 'Majestic' class in 1895 that the thickness of the water-line belt, which had risen to 21·6 inches in the French 'Amiral Duperré,' to 17·7 inches in the Italian 'Ruggiero di Lauria,' to 18 inches in the English 'Collingwood,' was reduced to 9 inches; but at the same time the depth of the belt was increased, and a commencement was made to protect the upper portion of the hull. This evolution of the armour protection has continued, and to-day we find the 'King Edward VII.' with a 9-inch belt at the water-line carried up over the side to a height of 16 feet, although the upper belt has a somewhat reduced thickness, while in our 'Patrie' class there is an 11-inch water-line belt, with a lighter belt, the depth of which, however, is only 8 feet above the water-line. Which ship is the better protected of the two? Clearly the 'King Edward VII.'! In Italy the thickness of the water-line belt of the 'Vittorio-Emanuele III.' and her sisters is 10 inches, but the whole of the hull is protected by lighter armour with a maximum thickness of 8 inches, tapering to 4. The same development is going on in the United States Navy.

"The causes of the change are simple. In action the ship is a large target. The part of this target protected by the armour belt is very small and is often submerged by the sea. It is only chance projectiles which strike the belt, and they must strike fairly at right angles to penetrate; and even if the belt is pierced, it does not follow that the ship is fatally injured. In no modern naval battles has there been a case of a ship being sunk through her water-line belt being pierced. In the battle of the 10th August that fine ship the 'Tsarevitch' was placed *hors de combat*, not because her belt was destroyed, but because her steering gear was injured. The conclusion therefore to be arrived at is that the thickness of the belt should be decreased, as it is hardly ever struck, and that the portions of the hull above be protected, as they are always damaged.

"It is necessary," M. Lockroy continues, "that the 'battle-ship' of our 1905 programme should mark a distinct advance over all ships of that character at present being constructed either in Europe or the United States. France, for Budgetary reasons, must continue to keep the lead in the matter of naval architecture. As she is not sufficiently rich to have a superiority in numbers, it must be obtained by superiority

in the matter of *matériel*. The ship which we must build must be not the ship of to-day, but the ship of to-morrow. All the improvements already realised by ourselves or abroad must be embodied in the new ships; but above all it is necessary that her predominating quality must be the power to take the *offensive*. And that, not only because the *offensive* is the most effective means for destroying the power of the enemy, but because it is also the best means of *defence*.

"No protection is of more value than that given by the guns and which gives a superiority of fire. It is not the armour, no matter what its thickness may be, which avails. From the point of view of the safety of the ship it is the wall of projectiles from her guns with which she surrounds herself. When a hurricane of steel sweeps away all the upper part of a ship she is scarcely in a state to reply with effect. The battle of the 10th August, 1904, is, thus considered, suggestive. The Japanese, by the fire of their guns, which carry far and carry straight, kept the Russians at a distance, overwhelmed them with the weight of their fire, and without themselves sustaining much loss, dispersed their opponents or placed them *hors de combat*. Togo was protected by his shells far better than by the armour of his ships.

"The battle of the 10th August, 1904, like that of Santiago, showed that the range at which battles will practically be fought will rarely be under three thousand yards; and that the advantage will probably rest with the one of the two adversaries who first makes his fire effective, and certainly with the one whose guns have the greatest velocity and penetrating power. From this results the necessity for increasing the number of guns, and above all, their calibre, because it is the calibre which, up to a certain point, means power. This has been already recognised in other Navies, and here again the process of evolution has been interesting. Up to the present, in a general way, four heavy guns (12-inch) have been the maximum number carried, with a more or less numerous battery of guns of medium calibre (ordinarily the 6-inch), but we now see the introduction of new guns of heavy calibre. Thus in the 'King Edward VII.' we see four 9·2-inch guns added to the ten 6-inch guns of the secondary battery. In the U.S. new battle-ship 'Connecticut,' the most formidably armed ship of all, we find to her four12-inch guns have been added as her secondary armament eight 8-inch guns and twelve 7-inch guns; in the Italian 'Regina Margherita,' four 8-inch guns have been added to the secondary battery. This increase in the number of heavy guns is becoming universal, and in four of our latest battle-ships 7·6-inch guns have been substituted for the 6·4-inch; but in doing this, M. Pelletan, who muddled everything he touched, has destroyed the homogeneity of the squadron.

"We must make up for lost time. Our artillerists are among the best in the world, but they have so multiplied the types of guns that our ships are veritable floating museums of artillery. Thanks to the delays in their construction, brought about by M. Pelletan, our ships of the 1900 programme are already behind the time; they are less well protected than the 'King Edward VII.,' from an offensive point of view their armament is insufficient, and the supply of ammunition carried in their magazines is far too small, and in this respect our ships are distinctly inferior to the English.

"I consider that the 12-inch guns carried by our battle-ships are too heavy; they are intended to pierce the water-line belts of ships to which they may be exposed, but all recent experience goes to show that if the

belt is struck at all, it is only by chance. We should arm the ships of our new programme with sixteen 10-inch guns, with an ammunition supply of at least 200 rounds per gun, and they would then be among the most powerful—if not the most powerful—units to be found in any Navy. The radius of action of the ships should be not less than 8,000 miles at economical speed, and they should have a *maximum* speed of 21 knots—3 knots above the ordinary speed of foreign battle-ships. An increase in the amount of armour protection, larger magazines, more heavy guns, increased radius of action and speed, all mean an important increase in weight, so it will be necessary to increase the displacement of our new ships to at least 17,000 tons, and to reduce the thickness of the water-line belt. The cost will be about 42 million francs (£1,280,000)—a little larger than the present cost of our ships; but as the money will not be wasted over the construction of dissimilar ships—battle-ships and armoured cruisers—we ought to be able in five years to construct a new squadron of nine absolutely homogeneous ships, which would be a really formidable fleet, and which, if followed by similar programmes, carried out in the same time, would assure us by 1917 a fleet on a perfect equality with that of Germany. The actual programme would cost about 378 million francs (£15,120,000); as we now expend from 100 to 120 million francs (£4,000,000 to £4,800,000) a year, a further expenditure would be necessary.

"It would cost money; but France is a great European and Colonial Power. She has important interests on every continent and in every sea, which must be safeguarded. Are we to maintain our place in the world, or are we to allow ourselves to be deposed? That is the question on which hangs our naval programme. If we wish to preserve our great place in the world, let us make the necessary effort to preserve it intact.

"When one speaks like this, there are always some imbeciles who immediately shriek: 'You want war, then?' Not at all; we want peace. But we wish, if war comes in spite of ourselves, to make victory possible for us. It is the Government which ought to be pacific, it is not the fleet. We will say, if we wish to find a suitable formula for embodying the naval future of France: 'A defensive policy and offensive ships!'"

NOTE.—M. Lockroy contributed these letters to the *Temps* in May last, and it is interesting to note that in the Estimates for 1906, which have just been published, the three battle-ships of the next year's programme are to have a displacement of about 17,500 tons and to have an armament of four 12-inch and twelve 10-inch guns.

UNITED STATES. — *Report of the Secretary of the Navy.* — In his annual report for 1904, the Secretary of the Navy calls attention to the fact that while the Naval estimates for the next fiscal year are the largest ever submitted, they are $17,000,000 less than the total of the estimates presented by the chiefs of the various bureaus, and call for less money than is actually required to continue the programme laid down by the Navy General Board. The Secretary also notes the interesting fact that last year was an important one for the reason that it witnessed the launching by the United States of a larger number of war-ships than were ever put into the water by this or any other country during a similar period.

The Navy last year cost the American people a little more than one doller *per capita*, which is a trifle as compared with the cost of war, and the expenditure, as Secretary Morton observes, is the best insurance

we have against war. "We want such a Navy in size, style, and 'sand,' he continues, "that no other Navy will ever desire an engagement with us. It is our greatest exhibit in favour of peace."

Secretary Morton makes no specific recommendation as to the creation of a Navy General Staff, remarking that the matter was carefully considered by his predecessor and by the General Board. He points out that it is conceded that the upbuilding, preservation, maintenance, and efficiency of the Navy are to be attained only by unceasing exercise of trained vigilance in all departments, under intelligent and consistent general supervision. It is further considered that when the desired results are attained, and we have a satisfactory aggregation of ships well equipped and manned by a trained body of officers and men, the field for the exercise of wise administration is merely broadened. The Secretary adds that it is only fair to say that the work now being done by the General Board, with Admiral Dewey at its head, is directly in the line of preparation for war, and is of the greatest value.

The Secretary concurs in the recommendations of the Chief of the Bureau of Navigation as to the increase of the *personnel*, including the appointment of two vice-admirals. Referring to the fact that there is no general statute authorising the bestowal of medals of honour upon officers of the Navy, the Secretary earnestly recommends that officers of the Navy be placed on the same footing as officers of the Army with respect to recognition for conspicuously meritorious conduct, and suggests that accordingly medals of honour of two classes be authorised, one to be given for acts of gallantry performed in time of peace, and the other for acts of special heroism in time of war.

The weight of opinion among officers of rank and experience, says the Secretary, is that the consolidation of the Engineer Corps with the line is working well. He approves the recommendation of the Chief of the Bureau of Steam Engineering that provision be made for the promotion of warrant machinists to rank with, but after ensigns, but he dissents from the opinion of certain ordnance experts that the Navy should, under ordinary circumstances, undertake to manufacture all, or even the greater part, of the guns and ammunition required for the Service. Mr. Morton holds that while it is desirable to maintain a naval gun factory in such a state of efficiency as to be capable of turning out guns of all calibres required, inasmuch as the existence of such an establishment tends to keep prices down, and to prevent the formation of monopolies for the supply of ships' armaments, it is better to adhere, in the matter of armament, to the general policy adopted with respect to ships and armour. He adds:—"At more than one Navy yard it is possible to build war-ships, and the Government is actually building them at some of the yards; but this is the exception. Most of the new ships are under construction at private establishments, and all armour is furnished by private concerns. It would seem wise to follow the same general policy with respect to armament. The Government should not unnecessarily enter the industrial field. The development in time of peace of large private establishments, with extensive plants and a force of skilled artisans capable of building ships of the first class, making armour of the best quality in all weights, and constructing guns of every kind and supplying fixed ammunition therefore is desirable, inasmuch as the existence of such establishments may be of important service in time of war."

Mr. Morton does not regard the question of using fuel oil on naval vessels as a matter which has been adversely settled. He invites atten-

tion to the recommendations of the Paymaster-General of the Navy with regard to the Navy Pay Corps, to the need of an increase in the *personnel* of the Marine Corps, and to the recommendations of the Judge Advocate-General of the Navy regarding additional legislation. As to the citizenship of the *personnel* of the Navy, the Secretary says:—"All commissioned officers of the Navy are citizens of the United States. Of the total enlisted force, numbering 28,321, 80 per cent. are native born, 11 per cent. naturalised, giving, therefore, 91 per cent. as citizens of the United States. Recruiting, now carried on extensively in the States of the Middle West, brings to the Navy an excellent class of young men. No better material can be found anywhere. If a taste for the Service can be developed among this class of our citizens to such a degree that the enlisted *personnel* can be largely recruited from this source, great advantage to the Navy will result. To this end it must be the united aim of all who have to do with naval administration to see that the enlisted *personnel* is dealt with justly."

The money deposited by seamen with the Government during the year amounted to $575,094.98. Of another influence which has been helpful to the enlisted men of the Navy, Mr. Morton says:—"Good results have followed the gifts of patriotic and public-spirited men and women, by which there have been established at several of the Navy yards and stations Young Men's Christian Association buildings, providing practically club houses or homes where persons in the Navy may meet socially and find, in wholesome surroundings, healthful and rational recreation. The thanks of the Navy, and of all who have its best interests at heart, are due to those who have, with such wise and discriminating philanthropy, founded and promoted this good work."

Mr. Morton's report concludes with the following tribute to an accomplished officer recently removed by death:—"By the sudden death of Rear-Admiral Henry Clay Taylor, Chief of the Bureau of Navigation, the Navy suffered the loss of an accomplished officer, and the present head of the Department, then just entering upon his duties, was deprived of an experienced and sagacious adviser whose intimate acquaintance with and accurate knowledge of the needs of the Service would have given his counsel high value. This sense of personal loss is augmented by the fact that during his riper years, as President of the War College, as member of the General Board, and as Chief of the Bureau of Navigation, Rear-Admiral Taylor had given earnest consideration to the problems at this moment occupying the attention of all interested in the welfare of the Navy."—*U.S. Army and Navy Journal.*

MILITARY NOTES.

PRINCIPAL APPOINTMENTS AND PROMOTIONS, JULY, 1905.

The King has been graciously pleased to appoint H.R.H. Leopold Charles Edward George Albert, Duke of Albany (Reigning Duke of Saxe-Coburg and Gotha), K.G., G.C.V.O., to be Colonel-in-Chief of the Seaforth Highlanders (Ross-shire Buffs, the Duke of Albany's).

Field-Marshals.—Field-Marshal Sir G. S. White, V.C., G.C.B., O.M., G.C.S.I., G.C.M.G., G.C.I.E., G.C.V.O., to be Governor of the Royal Hospital, Chelsea.

Generals.—General Sir G. Clerk, K.C.V.O., C.B., to be Colonel Commandant of the Rifle Brigade (The Prince Consort's Own). General P. S. Lord Methuen, G.C.B., K.C.V.O., C.M.G., to be a General Officer Commander-in-Chief, 1st Class.

Lieut.-Generals.—Lieut.-General Sir J. D. P. French, G.C.V.O., K.C.B., K.C.M.G., and Lieut.-General Sir I. S. M. Hamilton, K.C.B., D.S.O., to be General Officers Commanders-in-Chief, 1st Class. Lieut.-General Sir C. Tucker, K.C.B., and Lieut.-General Sir H. M. L. Rundle, K.C.B., K.C.M.G., D.S.O., to be General Officers Commanders-in-Chief, 2nd Class.

Major-Generals.—Major-General Sir R. B. Lane, K.C.V.O., C.B., to be Lieutenant-Governor and Secretary of the Royal Hospital, Chelsea. Major-General Sir E. H. H. Collen, G.C.I.E., C.B., I.A., to be a Lieut.-General in the Army. Major-General H. L. Smith-Dorrien, C.B., D.S.O., to be Colonel of the Sherwood Foresters (Nottinghamshire and Derbyshire Regiment). Major-General and Hon. Lieut.-General Sir W. Bellairs, K.C.M.G., from Sherwood Foresters (Nottinghamshire and Derbyshire Regiment), to be Colonel of Princess Charlotte of Wales's (Royal Berkshire Regiment). Major-General E. O. Hay, C.B., a Major-General on the Staff for Royal Artillery, to be Major-General in charge of Administration. Major-General R. A. Montgomery, C.V.O., C.B., Major-General Sir R. C. Hart, V.C., K.C.B., K.C.V.O., and Major-General Sir J. Leach, K.C.V.O., Major-Generals on the Staff, to be Commanders of Coast Defences.

Colonels.—Lieut.-Colonel and Brevet Colonel R. C. Hellard, from h.p., is granted the substantive rank of Colonel in the Army, on appointment, as Director-General of the Ordnance Survey. Lieut.-Colonel and Brevet Colonel A. H. M. Edwards, C.B., M.V.O., Military Secretary to the Viceroy and Governor-General of India, is granted the substantive rank of Colonel in the Army. Brevet Colonel the Hon. J. S. Napier, C.M.G., Inspector of Gymnasia, is granted the substantive rank of Colonel in the Army. Colonel (local Brigadier-General) Sir A. R. F. Dorward, K.C.B., D.S.O., from a Colonel on the Staff, to be a Major-General in charge of Administration, South Africa, and is granted the rank of Major-General in the Army. Colonel D'O. Snow, from an A.Q.M.G. to be an A.A.G. Lieut.-Colonel and Brevet Colonel H. Read, C.B., I.A., to be a Colonel on the Staff in India, and is granted the substantive rank of Colonel in the Army. Colonel A. H. M. Edwards, C.B., M.V.O., to be Military Secretary to the Rt. Hon. Lord Curzon of Kedleston, G.M.S.I., G.M.I.E., Viceroy and Governor-General of India. Colonel G. P. Owen, a Colonel on the Staff for Royal Artillery, to be Commander of the Coast Defences, Dover (also in charge of Royal Garrison Artillery Records).

Austria-Hungary. — *Reorganisation of the War School.* — The Austro-Hungarian War School, whose present organisation dates from 1900, is about to be reorganised by a decree signed by the Emperor on the 9th June last. The important Austro-Hungarian military journals, the *Armeeblatt* and *Danzer's Armee-Zeitung*, give most interesting details with regard to the spirit and larger objects of the decree.

The object of the War School is thus defined: To impart to specially capable and prepared officers, accustomed to regimental service and of firm character, the principles of military knowledge indispensable for the command of troops, and for the method of working the machinery of command. The plan and the course of the studies should be so

directed that the War School should be a special Staff School. The period of the course is for two years. The principal tendency of the new organisation, says the *Danzer's Armee-Zeitung*, is to give a higher importance to regimental service, a tendency having the effect of bringing the Staff into closer connection with the troops. With this object the minimum obligatory term of regimental service for a candidate for the War School has been increased from 3 to 4 years, and the programme of the preparatory and final examinations have been limited. The extreme age limit for admission to the School has been put back to 30 years, as it was in 1900. A certain number of officers will be admitted to the School who have been specially noted when passing out of the *korpsoffizierschulen*—schools which are established in every army corps from the 1st December to the end of May, and whose object is to develop the military knowledge of the senior lieutenants of all arms; but this is, apparently, merely experimental. A reform of special importance is the abolition of the Higher School of Engineering, which ceases to act as a separate establishment of special instruction and is amalgamated with the War School, as was done similarly with the Higher School of Artillery five years ago. Officers of artillery, of the scientific troops (pioneers, railway, and telegraph regiments) will receive, as will the other officers, a superior education in the various military branches; but there has been laid down for them in addition, a special programme in which their specialities have been most thoroughly studied. Officers desirous of entering the staff of the engineers will, after their two years at the school, go through a third year's course, in which they will receive a special higher education. Officers of the scientific troops who have passed through the War School will in future be divided into two groups, viz.: those desirous of entering the Staff and those wishing to belong to the Engineer Staff.

Pupils at the War School are officers of the Common Army and those belonging to the Austrian and Hungarian Landwehrs. The conditions necessary for entering it are the following, viz.: to have at least 4 years' regimental service at the end of the month of October on the year of entry; to have passed 3 years of these 4 in a unit (company, squadron, or battery); to have very good certificates as to qualifications, and a good constitution; to be unmarried; to have a good pecuniary position; not to be more than 30 years of age; to know one of the national languages (in addition to German) sufficiently well for Service purposes, the proof of this knowledge being furnished by a mention on the list of qualifications or by a certificate of examination.

The new organisation will come into force at the commencement of the scholastic year 1905-06, as regards the first year's course; and at the commencement of the scholastic year 1906-07, as regards the second. The Higher School of Engineering will cease to act at the commencement of the scholastic year 1905-06. Pupils at the War School completing their second year in the autumn of 1907, and who should be posted to the Engineers, will receive a special course of technical instruction for a third year. The new examination conditions will be applied to candidates, for the first time, in 1906. Nothing is changed regarding the examination of officers presenting themselves in 1905. After making out the list of the candidates admitted, the Commander of the School will send back to their corps those who failed to pass, together with the results of their examination. The Imperial War Department decides on the admission of the new pupils, and publishes the results of their examination. The pupils of each year are divided, according to the

subjects taught, into 4 classes, *a*, *b*, *c*, and *d*. The highest effective of each of the classes of a year's course is 150 pupils, including those of the Landwehr. Except as regards tactics, staff duties, military history and strategy, special programmes are laid down for the different branches of the Service.

Alpine Troops.—Austria has a very practical Alpine organisation. It consists in forming units corresponding to the needs of war and to the theatre of operations. In peace time 6 infantry mountain brigades are recruited consisting of one or two regiments with one or several jaeger battalions. In war time these troops form mountain brigades or divisions with a special transport. The Tyrol, as is known, has in addition its special organisation of national jaegers.

One mountain division, viz. : the 18th, may be taken as a type of the whole. This division forms the troops for the occupation of Bosnia and Herzegovina, and consists of the following, viz. : *Command*—a lieut.-general, a staff major, and a staff captain; *troops*—3 mountain brigades and 1 divisional reserve. Each brigade consists of an infantry regiment, and 1 jaeger battalion to the 1st and 2nd Brigades and 2 to the 3rd Brigade, and 1 mountain battery. The *reserve* consists of 1 company of Dalmatian jaegers, a half squadron of cavalry, with a platoon of Dalmatian mounted jaegers, 1 mountain battery, 1 light field battery, and 3 companies of engineers. The departments are represented by a transport squadron, 3 squadrons of pack animals, and 1 mountain medical section.—*Revue du Cercle Militaire* and *Revue Militaire Suisse*.

BELGIUM.—*New Infantry Musketry Instructions.*—The Belgian War Department has issued a new Infantry Musketry Instructions, which has appeared in three parts and has been issued to the troops. The 1st Part of the new Instructions is called "Instructions for the Rank and File," whilst the 2nd Part bears the title of "Instructions for Officers."

As regards the 1st Part, it is divided into an introduction and 5 sections. In the introduction it is laid down that the soldier must take part in all individual and group practices during the first year of his service. The 1st Section deals with the theory of Musketry. The individual training of the man is dealt with in great detail in the 2nd Section, and great stress in laid on its importance. Many sentences of this section, which are regarded as of special value, are underlined. It should be noted that during their entire service the men are daily exercised in aiming drill and firing exercises. Firing with blank cartridges must be diligently practised, and each man should expend about 50 rounds before being allowed to use live ammunition. Judging distance should be carried out conjointly with these exercises, and if possible, every man should be brought to such a state of perfection as to be able to estimate distances up to 600 yards with certainty. As regards individual firing, a distinction is made between garrison and experimental practices. The former take place on the ranges or on manœuvre grounds, at known distances only, the latter, on the other hand, always take place on manœuvre grounds, and are carried out at known and unknown distances. The more important of the two is naturally the experimental shooting as it should be preparatory to battle training, and can therefore be extended to distances up to 600 yards. In the 3rd Section of the Musketry Instructions, the rules for prize shooting and classifi-

cation are given. Distinction is made between marksmen and 1st, 2nd and 3rd Class shots. The best shots are made 1st Class privates or buglers. The 4th Section deals with group shooting, and the 5th Section with book-keeping.

The 2nd Part (Instructions for Officers) comprises: *a*. The teaching of cadres; *b*. Officers' shooting; *c*. Group shooting. The teaching of cadres lays down the following axioms:—Every officer must be able, in the most rapid manner, to determine: 1st, the time necessary at a given distance, with a given number of rifles, to obtain a given result; 2nd, how many shots should be expended to obtain a given result, on a certain position, or in a limited period of time; 3rd, if the supply of ammunition is in proper proportion to the results hoped for from the firing, and whether the same responds to the situation of the action. As regards the officers' shooting, it need only be mentioned that some weapon is given as a prize per regiment, and that rifle and revolver shooting, as well as judging distance, are taken into consideration in its award. The instructions for group firing contain scientific discussions as to the various angles of fire, the computation of the percentage of hits, ascertaining the cone of depression in mountainous and steep country, as well as on indirect fire, and shooting by night or in fog.

The recently issued 3rd Part of the Musketry Instructions gives explanations regarding ammunition, musketry *matériel* on the ranges and in barracks, telescopes, etc., as well as an exhaustive description of the Infantry "Stroobants Rangefinder." The following ammunition is laid down: 1st, for infantry, 160 live cartridges (to include group and field firing), and 145 blank cartridges; 2nd, for cavalry and engineers, 80 and 60 respectively. Individual firing is carried out on targets 8 feet by 10 feet at distance from 100 to 600 yards.—*Internationale Revue über die gesamten Armeen und Flotten.*

FRANCE.—*Alpine Troops.*—It was General Ferron, when he was War Minister, who seems to have first proposed the transformation of the Chasseurs of the XIVth and XVth Army Corps into Alpine Chasseurs. His scheme was, however, not at once adopted, and it was to his successor, M. de Freycinet, that its realisation was due on the 24th December, 1888.

12 Alpine battalions, of 6 companies each, and 13 mountain batteries were formed. To each battalion was attached a mountain battery and a sub-division of sappers, the whole forming an Alpine Group. Thus 12 groups were obtained, with an additional one formed by a battalion of the 97th Infantry Regiment. In addition, 7 battalions of Territorial Chasseurs, organised as Alpine troops, complete, on mobilisation, the active force. The recruiting is not exclusively regional, Alpine troops being drawn from all the districts in France. In peace time a total of about 10,000 men are under arms, whilst on a war footing there are 18,000 men of the Regular and 7,000 of the Territorial Army.

The training of the embryo Alpine troops commences, naturally, in the winter garrisons; it is completed from the month of May in the higher mountain ranges (summer garrisons) exactly in those defence sectors laid down for the different groups. This method allows for the thorough study of the country and for the rational training of the men. The units are broken up and distributed throughout the district; they work at first independently, but later, in July, they assemble together so as to form an Alpine Group with all its units. This is the manœuvre

period, which generally lasts till the middle of August. This period is followed by making field works and entrenchments, in either repairing or constructing roads and trenches for skirmishers in the defensive zone. Finally, in October, they return to their winter garrisons, leaving weak detachments to guard the forts.

The characteristic equipment of the French Alpine soldier is the *béret*—a Tam-o'-Shanter—a useful and practical head-dress. The jumper is loose with a turn-down collar. Putties are worn over the trousers, which are very loose, under the knee. Hob-nailed Neapolitan shoes are worn, which are made to the soldier's measure. The Alpine soldier also has an alpenstock, snow-shoes, skis, black goggles, etc., issued to him.

The configuration of the frontier dictates, so to say, the distribution of the groups. Of these 4 are for Savoy and the upper part of the Isère; 3 groups are in the valley of the Durance, with Grenoble as a winter garrison and the Brianconnais to be occupied in time of war. Another group guards the valley of Barcelonnette. The other 5 groups are distributed amongst the Maritime Alps, and occupy the valleys of the Tinée, the Vésubie, the Roza, and the strong position of the Authion.

The formation of the company on a war footing is as follows, viz.: 1 captain (mounted) and 3 lieutenants, total 4 officers; 1 adjutant, 1 assistant surgeon, 1 sergeant-major, 9 sergeants (1 quartermaster-sergeant), 17 corporals (1 quartermaster-corporal), 1 corporal driver, 4 buglers, 14 drivers, 4 hospital orderlies, 212 men, or altogether 262 rank and file, 11 pack and 4 draught animals. The battalion has 6 companies, and is commanded by a lieut.-colonel or major. It has on a war footing a staff of 5 officers (mounted), 2 surgeons (mounted), 41 rank and file, 16 pack and 13 draught animals. The total strength of the battalion is as follows, viz.: 29 officers, with 14 horses or mules, 2 surgeons, 1,625 rank and file, 82 pack animals and 37 draught animals. —*Précis from Revue Militaire Suisse.*

Combined Manœuvres in the Alps.—General Metzinger directed the combined manœuvres which took place in the Alps from the 26th July to the 7th August, between the XIVth and XVth Army Corps. The troops selected to take part in the manœuvres were the following, viz.:—

XIVth Army Corps.

6th Alpine Group (14th Battalion of Chasseurs).
7th Alpine Group (30th Battalion of Chasseurs).
A battalion of the 75th, 140th, and 157th Infantry Regiments.
A field battery from the 2nd Artillery Regiment.
A platoon of cavalry.

XVth Army Corps.

8th Alpine Group (23rd Battalion of Chasseurs).
9th Alpine Group (7th Battalion of Chasseurs).
A battalion of the 55th and 61st Infantry Regiments.
A field battery of the 19th Artillery Regiment.
A platoon of cavalry.

These manœuvres, which took place in the upper valleys of the Verdon, Var, la Tinée, and Ubaye, were carried out under particularly interest-

ing conditions, in that they represented, as far as possible, what would actually take place in war.

In the manœuvres carried out every year in the different army corps, the troops have every day to march, fight, and change camp, and matters are not carried out under ordinary conditions of war. Each day a great deal must be done in limited time, and the result is that the battle or engagement is hurriedly carried out, is curtailed, and is almost always alike, no matter what the nature of the ground may be. The director has the "Cease fire" sounded as soon as the adversaries are at grips, as soon as the assault has been delivered, or when the temperature or fatigue makes a rest necessary. In addition the necessity for the troops going to the camps fixed in advance, and often at some distance, necessarily takes from the action all possibility of being conducted as in war. The assault is not the last phase of an action, and in manœuvres both the pursuit and retreat are abandoned owing to lack of time, both of which are most necessary for troops to be exercised in, as they are the natural results of the assault.

General Metzinger took these matters into consideration in laying down the programme for these manœuvres of the XIVth and XVth Army Corps. They consisted of three distinct periods, of three days each, without any relation to one another, each consisting of a separate scheme, the development of each being carried out without stop and as completely as possible. A day's rest separated each of the periods.

At the commencement of each period, and for the whole of the three days of which they consist, a general scheme laid down the position of the two forces and their mission. The operations once commenced they had to be continued without interruption until the end of the period. Hostilities once commenced, commanders of hostile forces had every liberty and the time necessary to bring their action to a conclusion and to carry out their mission. Every evening the umpires sent into the Directing General their reports on the events of the day, on progress made and checks received. The Directing General then determined the limit of ground belonging to each side. This ground was at once occupied and guarded by the troops to whom it had been assigned; outposts were thrown out and the troops encamped or bivouacked under their protection. One condition only was laid down to avoid over-strain: "Night operations must be strictly confined to the units furnishing the outposts; the main body in camp or bivouac must not take part in them." The following was the general idea for the 1st period, viz., for the 27th, 28th, and 29th July, the XIVth Army Corps being the Northern and the XVth the Southern Force:—

A corps which has invaded the Maritime Alps pushes a detachment (Southern Force) into the valleys of the Verdon, Var, and la Tinée, to cover its right and to gain a footing in the valley of the Ubaye.

An opposing corps, which disembarks at Montdauphine-Guillestre, pushes forward rapidly a detachment of two Alpine groups (Northern Force) to meet the columns of the Southern Force in order to stop them and to cover the mustering of its own units at Jausier-Barcelonnette.

On the afternoon of the 26th July the Northern Force occupies the heights on the right bank of the Ubaye from the Camp des Fourches to the Col d'Albos. The heads of the columns of the Southern Force have reached Saint Etienne-de-Tinée, Entrannes, and Albos. The object of the Northern Commander is to cover Jausier and Barcelonnette; that of the Southern Commander to gain a footing in the valley of the Ubaye and to occupy Barcelonnette.—*La France Militaire.*

RUSSIA.—*Cavalry in the Present War.*—People have been greatly astonished at the small service which the Russian cavalry, although so superior in numbers, has rendered to the Russian Army during the present war. It is therefore of interest to note the ideas on this subject held in the Russian Army itself. The following is a *précis* of an article by Lieut.-Colonel Zalieski, of the Staff, which recently appeared in the *Rouskii Invalid* :—

It is difficult, says the author at the commencement, to imagine more unfavourable conditions for cavalry action than those under which that arm laboured in Manchuria, viz. : mountainous and unknown country, absence of detailed and correct maps, a population hostile and terrorised by the Japanese and Chinese authorities, ignorance of the language and local customs, trying climate, most difficult roads, and the irregularity of the supplies for both men and horses. All these should be taken into consideration when estimating the *rôle* played by the cavalry. According to the official instructions, the cavalry, an essentially mobile arm, should :—

1. Penetrate into the zone occupied by the enemy in order to reconnoitre it.
2. Harass his weak points, especially in his rear, and seize every opportunity to annoy him and damage his *moral* by raids, etc.
3. Ensure the service of security by holding all passages, roads and defensive lines far from the infantry, and to cover the Army by interposing between it and the enemy.
4. In action, to manœuvre and attack with dash, preferably mounted, to co-operate with the action of other arms.

Cavalry should, as a rule, obtain these various results as far as possible by mounted action, and the attack with closed ranks is regarded as its most powerful method of action. Should, then, these instructions be modified?

Colonel Zalieski sketches as follows the characteristics of the use of cavalry, according to what is known of the present war :—

The Russians had a great numerical superiority in cavalry; but it should be noted that the Russian cavalry consists almost exclusively of Cossacks, mounted on coarse-bred horses. It is, in addition, customary to detach a large number of Cossacks as orderlies, escorts, etc., which enormously diminishes the effective present with corps and clogs the actions of the cavalry. Scouting has, from the commencement, been carried out by small groups (officers' reconnoitring parties) or by detachments. This has frequently had to be done on foot, either owing to the difficult nature of the ground or because the enemy's fire compelled them to creep and crawl in order to pass them, sometimes by making use of the night and by leaving the horses behind. The service of reconnoitring demands not only a knowledge of the use of the horse, but also of the fire-arm. It has become evident that reconnoitring requires throughout the cavalry the development of a high degree of initiative and of the bump of locality. According to Colonel Zalieski, it is indispensable that every cavalryman should be trained in scouting and patrolling duties, which is their first *raison d'être*, and which cannot be left to a few specialists.

The object of raids is to harm the enemy, to force him to expend his force in the protection of secondary points, and to incessantly threaten him. This method of operation can only be successful if one acts quickly. General Mistchenko's raid in January last, on Inkeou, was too slowly carried out (at an average rate of 30 kilometres a day), which

was the chief cause of his repulse. The one, on the other hand, which he made from the 17th to the 19th May, towards Fakoumin and Chifoutsi, was rapidly managed, and in the course of it were combined mounted attacks, dismounted fire action, and the use of artillery, thus demonstrating that cavalry is by no means incapable of inflicting a real injury to the enemy if it knows how to make use of its mobility and of all the means of fighting it possesses—the sword, the *arme blanche*, the carbine and the gun. Moreover, during the different raids carried out during the present war, more work has been done on foot than on horseback.

It is thanks to its very great employment of dismounted fire action that the cavalry has been able to carry out its strategic missions, viz.: scouting in advance of the front, covering the flanks or protecting the retreat. If one can no longer speak of these operations it is on account of the weak cavalry effective in comparison to that of the Army. There are no examples, in the present war, of the intervention of large cavalry units in battles of the other arms. It would, nevertheless, appear that in battles lasting for several days, as at Liao-yang, on the Sha-ho, and round Mukden, the fatigued hostile infantry might well have had its *moral* seriously shaken by the action of masses of cavalry, especially at the time when the Japanese artillery, having already suffered severe loss, was nervously firing its last shells to ensure success.

Should, then, the principles guiding the employment of cavalry and the *rôle* of that arm be changed as a result of the apparent lessons of the present war? Colonel Zalieski thinks not. According to him, the present war has shown that the Russian cavalry, like all the Russian Army, is not suitably trained with a view to war—not that its *rôle* has become impossible.

The following are the proposals made by Colonel Zalieski, of the Russian General Staff, with the object of rendering cavalry more fit for carrying out its entire duties and of completing its *rôle* :—

The first and most important essential of the lessons of the present war is that everything that is not necessary in war time is useless in peace. The second is, that the general features of a battle have changed during the last quarter of a century. Infantry buries itself in the ground; artillery conceals itself by means of the terrain, and is well protected by the infantry. Their fire has reached a compass and an efficiency hitherto unknown as regards precision, rapidity and destructive force; the enemy is not even seen when his fire causes losses. Fighting formations have become less compact, but they are not less strong on that account, as they rely upon trenches, artificial obstacles, and on the force of the fire. What should the cavalry do? Could it manœuvre on battle-fields in compact masses of brigades, divisions and cavalry corps, as formerly? There is no doubt that evolutions by cavalry on battle-fields have been made far more difficult. The fire of the enemy does not permit it to move or to remain in large masses.

Cavalry formations should become thinner and more capable of manœuvring in fractions connected together, not by means of normal formations, but by a common object or mission given by the commander. Thus, in the division, each regiment of the fighting line (and not merely of the 1st line) should be given its special mission, and those of the Reserve would remain at the disposal of the commander of the division, who would direct his unit to a point of observation which would allow him to throw rapidly to the front the whole or a portion of the division. An essential change is apparent even in the missions of

cavalry. Up to the present we have believed that the boot-to-boot charge was the chief, if not the only, means of overthrowing the enemy; nowadays we must modify this formula, and, whilst retaining the boot-to-boot charge to play the same *rôle* as the bayonet charge with infantry, we should attribute a very considerable importance to fire action. This brings us to direct a particular attention not only to rifle and revolver fire (not excepting firing from horseback, which is indispensable in scouting), but also to that of artillery, and also more especially to the employment of machine guns. One of the most important necessities of cavalry is to provide every regiment, and perhaps every squadron, with machine guns.

The breaking up of units, unconnected with the fighting formation, gives a still greater importance to the connection between corps and with the command. Recourse might perhaps have to be had during action not only to optical but also to telegraphic and telephonic connection. Cavalry should, consequently, be carefully trained to the use of telegraph and telephone, as well as of optical signals, and generously provided with the necessary *matériel* with that object. Actions by cavalry should resemble in their whole the actions of infantry. This, however, should only be during the preparatory stage of the fight—a stage which, as regards cavalry, continues up to the moment when its mass, or a portion of it, finds propitious for decisive action; that is to say, for mounted attack. In order not to lose such a moment, every cavalry commander should follow the action closely, and reconnoitre the ground as widely as possible, so that he may not find himself checked by unexpected obstacles at the moment favourable for attack. In this act of the drama, cavalry should put everything on the throw of the cards, and should prove itself that terrible arm which strikes not only at the physical qualities of the adversary but also at his *moral*. This constant state of preparation to act thus should keep the enemy in a state of inquietude even during the preceding stage; the smallest mistake on his part, and the cavalry from its position of expectancy may pass to decisive action the force of which is in direct relation to the capacity of the cavalry for rapid changes of position. This rapidity of movement, this capacity for acting simultaneously on a large front, to combine the fire and the mounted charge are indispensable alike in reconnoitring, in raids, and in strategic operations in conjunction with other portions of the Army.

In order that cavalry may be fit for this *rôle*, its officers, and especially its field officers, should have a very highly developed military training. The knowledge of drill and of brigade and division formations, of interior economy, etc., is far from being sufficient; every cavalry officer, in addition to a thorough military training, great mobility, endurance and aptitude, should be, in everything, a model to his men. From a troop of cavalry should be expected not merely the capacity to move in mass during short journeys, but a still larger mobility, viz., capacity to surmount all obstacles, including rivers, and to travel over hundreds of kilometres; a knowledge of the use of the carbine, and a great capacity for initiative must also be demanded of them. Everything done for the training of cavalry in this regard is insufficient. During drill and manœuvres special attempts are made to apply regulation methods—manifestly useless on modern battle-fields. In short, the present war has principally shown :—

1. The necessity for a good musketry training with both the carbine and the revolver, not only on foot but also mounted, in view of individual combat.

2. The necessity of providing cavalry with machine guns, if only at the rate of one per regiment

3. The necessity for increased mobility; and for that (*a*) to require the horses to work every day; (*b*) give up having fat horses; (*c*) lighten the pack and the harness, as well as the equipment and armament of rider; (*d*) carry out a training for crossing all sorts of obstacles, including water.

4. The drilling in large units, as the object of training must be abandoned, and that of the regiment simplified; only retain in the regulations those movements which can be really carried out in war.

5. Entirely give up all special regulations for reviews and marching past, and if possible drop reviews which entail a march past.

6. Retain inspections, and consequently the hours of training in manœuvre by giving a larger portion of them to initiative, the employment of fire, the utilisation of ground, the combination of fire with shock tactics or with the threat of a turning movement. Seriously study reconnoitring duty, observation of an action, connection between the command and neighbouring units, etc.

If the cavalry is willing to enter on these lines of training, which are really practical and really serviceable in war, it may still take part advantageously in the fight and assist other branches of the Service in spite of the complication of the modern battle.

Mischievous Customs in Peace Time in the Army.—The *Rouskii Invalid* also publishes an article by a field officer, returned from Manchuria, where the author cites a certain number of mischievous habits obtaining in peace time, which are most detrimental in the field, and which many months of war have not yet succeeded in entirely eradicating. In support of this statement he cites the following facts, to which he was a witness:—

1. Want of adaptation of the methods of action and of formations to the necessities of modern fighting, and insufficient utilisation of ground.

2. Officers, even of the highest rank, expose themselves too much and unnecessarily to the enemy. Generals walk about on the crests without any necessity, accompanied by their flag and their Staff. This results in useless losses, not only amongst the officers thus exposed but also amongst the troops on whom the enemy's fire is immediately drawn when the presence of the officers is guessed.

3. The Russians take up positions too much in view of the enemy, even when on the offensive.

4. Commanders of high rank most frequently place themselves too close to the skirmishing line or near advanced groups, so that they are unable to supervise the whole situation; they occupy themselves with detail, and are thus hindered from properly following the course of the action.

5. Insufficient connection as well between groups of the same unit as with neighbouring units, both in length and in depth; want of practice in reporting to higher authority, in a clear and concise manner, events taking place amongst the troops in contact with the enemy.

6. Total absence of personal initiative amongst non-commissioned officers owing to the bad methods of command and training in peace time, when nothing may be done except in presence of an officer, with the result that the lower ranks and the men waited for orders for the simplest things.

7. Defective carrying out of the security service in quarters, on the march, and in action.

8. Too great dogmatism in the employment of fortifications which do not sufficiently conform to the ground.—*La France Militaire.*

WAR NOTES.

It was not until six weeks after her overwhelming victory in the Sea of Japan, which ensured her the mastery of the Eastern Seas, that Japan commenced operations for wresting the island of Sakhalin from Russia. On the 4th July, Admiral Kataoka, commanding the Northern Squadron, set out with that squadron, escorting a landing party, from Sakhalin. The island was reached on the 7th. The Kondo Promontory, the S.W. point of the island, was bombarded and captured, and fire was opened on Meree, Shipivan, and Koraskovak on the coast. At Meree the Japanese landed troops, and the Russian detachment was compelled to retire northward. Telegraphing on the 24th July the Russian Governor of Shakalin says: "At noon two Japanese torpedo-boats stopped off the mouth of the Arkoff river, 7 miles N. of Alexandrovsk post, and bombarded the coast," and shortly after it was officially reported at Tokio that Alexandrovsk had been captured. On the 27th the following official telegram from Tokio was published: "Our Sakhalin Army began landing near Alkova at 9 a.m. on the 24th inst. without much opposition. Admiral Kataoka, commanding the squadron despatched north, reports that the squadron left the base as prearranged, convoying military transports. A previously advanced detachment, under Admiral Dewa, reconnoitred the coast. The dragging operations predetermined the landing place near Alexandrovsk. Transports were convoyed landward, as dragging operations progressed. The marines landed without resistance, and occupied points necessary for landing. Afterwards the landing of troops commenced. . . . . The Japanese flags are now flying over the Governor's office at Alexandrovsk and houses in town. No damage to ships or crews." The Japanese advance in Northern Sakhalin was continued on the 27th, and Luikoff, to which the Russian troops had retreated, was entered by the Japanese cavalry on the evening of that day. They afterwards withdrew, but the advance was resumed the following day, and the place was effectively occupied during the morning after some street fighting, and the Russians were driven southward, sustaining heavy loss in men and *matériel*. The Japanese continued the pursuit of the Russians retreating from Luikoff, and on the 30th July the Russian Military Governor of Sakhalin asked for a cessation of hostilities, and on the following day he and about 70 officers and 3,200 men surrendered to the Japanese, and the occupation of Sakhalin by the latter was practically complete.

Matters are also becoming serious in the direction of Vladivostok, and the collaboration between Admiral Kamimura and the Japanese VIth Army Corps should shortly give some results. On the 17th July a general reconnaissance of the coast between the Tumen and Cape Linden was carried out by the Japanese fleet, and several Russian posts, including that guarding the mouth of the Tumen, were bombarded and dispersed. Some small engagements between Hasegawa's forces and the Russians took place on the 19th and 20th. On the 22nd a general attack was delivered by the Japanese, and the Russians retreated in a direction parallel to the coast.

On the mainland the position continues much the same, the hostile forces facing one another and both strongly entrenched. The rainy season and the immense transport difficulties are no doubt greatly responsible for the long delay in the operations in Manchuria.

NAVAL AND MILITARY CALENDAR.

JULY, 1905.

2nd (S.) The Japanese and Russian Peace Envoys were selected.
4th (T.) Launch of first-class battle-ship "Katori" at Barrow-in-Furness for Japanese Navy.
" " 3rd Bn. Royal Warwickshire Regiment arrived in South Africa from Gibraltar in the "Dunera."
6th (Th.) French Submarine "Farfadet" foundered in the Lake of Biserta.
8th (Sat.) A Japanese force landed at the Island of Sakhalin.
10th (M.) The Atlantic Fleet arrived at Brest.
11th (T.) H.M.S. "New Zealand" commissioned at Devonport for Atlantic Fleet.
12th (W.) H.M.S. "Thetis" from China paid off at Chatham.
" " H.M. the King presented new colours to the 2nd Bn. King's Own (Yorkshire Light Infantry) at Sheffield.
" " The Secretary of State for War issued an amended circular with regard to the Volunteers.
13th (Th.) French Submarine "Farfadet" raised.
14th (F.) H.M.S. "Sentinel" left Devonport for Mediterranean.
" " H.M. the King presented new colours to the 3rd and 4th Bns. (Militia) The King's Own (Royal Lancaster Regiment) at Knowsley.
15th (Sat.) H.M.S. "Antrim" commissioned at Chatham for service in First Cruiser Squadron.
" " H.M. the King and Queen opened new Home for Officers' Widows and Daughters at Wimbledon.
" " Great Britain announced her willingness to take part in the Morocco Conference.
17th (M.) The Atlantic Fleet left Brest.
18th (T.) H.M.S. "Pathfinder" commissioned at Chatham for Atlantic Fleet.
" " H.M.S. "Royal Arthur" commissioned at Portsmouth for service as flag-ship of Fourth Cruiser Squadron.
" " A Japanese landing was reported North of Vladivostok.
19th (W.) Admiral Rojestvensky's report on the Battle of the Sea of Japan was published.
" " H.R.H. the Duke of Saxe-Coburg and Gotha assumed the government of that Duchy.
20th (Th.) H.M.S. "Amphitrite" arrived at Plymouth from China.
23rd (S.) H.M.S. "Venerable" arrived at Sheerness from Mediterranean.
" " The Tsar of Russia and the German Emperor had an interview in the Gulf of Finland.
27th (Th.) H.M.S. "New Zealand" left Plymouth to join Atlantic Fleet.
28th (F.) The Secretary of State for War had a conference with Volunteer commanding officers.

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NOTICES OF BOOKS.

Detailed History of the Railways in the South African War, 1899-1902. Compiled and Published by the Royal Engineers' Institute. 1 Vol. and 1 Vol. Plans. F'cap folio. Chatham, 1904.

The Royal Engineers' Institute deserve the greatest credit for having taken on themselves the work of publishing the above Record, which is a continuation of the General Report issued by Lieut.-Colonel Sir E. P. C Girouard, K.C.M.G., R.E., the then Director of the Transvaal and Orange Colony railways, which appeared at the end of 1903.

It appears that after the war was over, the various reports on railway operations were abridged and re-arranged at the War Office, to form a connected *History of the Railways during the War in South Africa, 1899-1902.* The compilation was divided into four volumes, each accompanied by its own illustrations; the first consisted of Lieut.-Colonel Sir E. Girouard's original "General Report"; and the remainder comprised abstracts of numerous other reports, concerning the Cape, Natal and Imperial Military Railways, and also sundry special organisations, which, though strictly speaking, extraneous to railway working, had been inaugurated and administered by Railway Officers under the control of the Director.

The *History* was completed in November, 1902, submitted for official publication, and accepted; but considerations of the expense involved subsequently caused the Treasury to sanction the printing of the 1st Volume only. When this decision became known, the Committee of the Royal Engineers' Institute resolved in October, 1903, to complete the publication themselves, rather than allow such a valuable record of the largest railway operations ever undertaken by a British Army in the field to be entirely lost to posterity. The three last portions of the original compilation have been compressed into two volumes only, viz.: I. Letterpress; II. Illustrations; and it is satisfactory to know that the Treasury reconsidered their attitude and sanctioned the expense.

Space will not permit of doing more than briefly calling attention to the different subjects dealt with in this "Detailed History." It goes fully into the separate branches of Railway working on the various lines. Parts I. and II. deal respectively with the railways in the Cape and Natal Colonies, and contain much valuable matter regarding the measures taken to work them under the stress of invasion and war.

Chapter II. of Part I. is important, as in it are discussed at some length the questions of a Military Controlling Staff and the relations which should exist between it and the Technical Staff of a railway in friendly country. "Continental nations," we are told, "have agreed upon the organisations, and have laid down the broad outlines of instructions considered necessary; and the matter has received considerable attention in India, where on occasion 50,000 men and more have been moved to the frontier. In England, on the other hand, the great Railway Companies have from time to time moved troops as required, and it has not been necessary to ask for military assistance; as a consequence, neither the organisation nor the necessary rules had been thought out in 1899." In Chapter I. of Part IV., this question is again discussed, and the following conclusions drawn :—"The facts which have been here set down

make it abundantly clear that for the management of railways in war there must, of necessity, be a Military and not a Civil Controlling Staff; and further, that it would be to the advantage of the Army generally that there should be an appreciable number of officers conversant with at least the elements of railway traffic work."

Two instances among many are given of unwarranted interference with traffic working, which would appear ludicrous were not the consequences so serious. On one occasion a Section Commandant delayed traffic for 3½ hours by using an armoured train to escort a convoy of cattle on the march; on another, an officer refused to allow an engine to take locomotive coal from a station, because the coal stack formed part of his defences. Great stress is laid on another point—one which had far-reaching effects—viz., "the neglect by all ranks of the Army of the fundamental rule that wagons, on arrival at destination, must be off-loaded with the least possible delay, and that in this matter there should be no room for argument, whether the necessity be apparent or not to officers on the spot." Neither officers nor men appear to have realised that a loaded truck is no truck at all for transport purposes.

Part III. deals with the organisation and work of the Railway Pioneer Regiment, a unit specially raised in South Africa, mostly on the Rand, to assist in dealing with the immense amount of repairs rendered necessary on railway lines through the wholesale destruction carried out by the Boers in their retreat before the British Army in the Orange Free State, and which performed most valuable service.

Part IV. contains a full account of the Imperial Military Railways, a title given to the enemy's lines as they were successively captured. It divides itself broadly into the history of the Reconstruction, Management, and working of the Railways in the Orange River and Transvaal Colonies. Chapter I. is most interesting, and deals with the difficulties encountered in working the railways: *a. From internal causes. b. Caused by the enemy.* It has already been mentioned that the Railway Pioneer Regiment was raised from civilians and the valuable work it performed; but it is only fitting that the following generous testimony to the unflinching devotion to duty of the Civilian Railway Staff should also be recorded:—"In the course of this narrative," we are told, "the risks and dangers to life attendant on the operations of the lines of railway has been referred to; and it is therefore but fitting that the behaviour of the Staff, and especially the running Staff, should be brought to notice, and that their devotion to duty should be recorded. They were nearly all civilians, and it is no exaggeration to say that all, to some degree, and the engine-men especially, carried their lives in their hands. Exposed to dangers from mines, from train wreckers, and from parties in ambush, they nevertheless persevered; *and the driver who, with his fireman dead beside him, and himself shot through both arms, brought his train safely through a force of the enemy, one hand on the lever and one on the brake, affords a stirring example of what the Civilian Staff could and did do to further the British cause.*"

Part V. contains a most interesting account of the organisation, equipment, and use of Armoured Trains; while Part VI., which concludes the "History," deals with the Army Labour Depôts, another special organisation, established by the Director of Railways to meet the demands of the Army at large for native labour.

Volume II. gives as a frontispiece a general map of Railways in South Africa, and contains 93 different plates, with a collection of 61 interesting photographs.

The History of the King's Body Guard of the Yeomen of the Guard. By Colonel Sir REGINALD HENNELL, D.S.O., Lieutenant of the Guard. 4to. Constable & Co. London, 1904.

Colonel Hennell received his first appointment as an Exon of the Guard in 1894, and immediately set himself to study the old records of his renowned corps, but to his disappointment he found practically no records in existence, as they were burnt in the disastrous fire of 1809, when that portion of St. James's Palace, where the Guard had its quarters was destroyed. Colonel Hennell determined to retrace the records; the late Queen placed at his disposal all the State papers concerned, and the results have been embodied in seven official volumes, now preserved at the headquarters of the Corps at St. James's Palace, of which the present volume contains a summary. Colonel Hennell was nine years engaged in his task, and he has collected an immense amount of valuable and interesting information, bearing on the history of the grand old Guard, which, as the author tells us, "full of quaint records and great occasions, has been interwoven with the lives of the sovereigns and the people of the British nation for over four centuries."

Though unfortunately the actual warrant constituting the Guard has never been found, the State Records prove conclusively that it was created less than twenty-three days after the battle of Bosworth Field (22nd August, 1485); that its title was "Yeomen of the Guard of our Lord the King," or, as the fifteenth-century warrants describe it, "Valecti garde domini Regis," and it can, no doubt, justly claim to be the oldest military body in England, and it is believed in the world. The celebrated Swiss Guard of the Popes was not founded until 1505, while the "Guardia Nobile" appears to have been founded the same year as the "Yeomen of the Guard." In Chapter I. the author traces the earlier Royal bodyguards, which seem to have existed in some form from 1191, when Richard I. raised a body of mounted Guards to protect himself from the Saracen assassins, in the employ of the "Old Man of the Mountain." In Chapter II. he narrates the creation of the present Guard, which appears to have been formed from a small band of faithful followers, who accompanied Henry VII., as he became, from the time he landed at Milford Haven at the beginning of August, 1485, up to the conclusion of the fateful day of Bosworth, when their incorporation as the "Yeomen of the Guard" followed. Colonel Hennell gives us the origin of the nickname, "Beefeaters," which seems to have been very simple. Some writers have attempted to show that the term was derived from the French "buffetier"—a servant who attends the buffet or sideboard—but the real origin is to be found in the account written by Count Cosmo, the Grand Duke of Tuscany, of his travels in England in the 17th Century. "The Count was much at Court in 1669, and describes the Yeomen of the Guard as the 'Guardia della Manica'—the 'Guard of the sleeve.'" At that time the coats of the Guard were very full, especially the sleeves. The Count then goes on to say: "They are called 'Beefeaters,' that is, eaters of beef, of which a considerable portion is allowed them daily by the Court."

It is impossible to follow Sir Reginald Hennell through his interesting work, which contains a good deal of attractively written history. He has devoted a chapter to events connected with the Guard in each reign, from Henry VII. down to our present King, and we learn that the last battle at which the Guard was present was that of Dettingen, where it was in attendance on gallant little George II. No civilians have been

appointed since 1848, although at one time it seems to have been the practice to appoint some, especially during the reign of the Georges. Thus the Guard consists to-day, as it did originally, of veteran officers and soldiers, no officer being appointed without war service. The title "Clerk of the Cheque" (spelt "Check" in MS.) seems to have existed from the formation of the Corps, as well as that of Ensign, the title "Exon" from the time of Charles II.

Naturally the Author gives much attention to the uniform of the "Yeomen," and there are some excellent illustrations in Chapter II., showing the development of the embroidered symbols on the coats of the Guard from 1485 to 1904. The Thistle was added by Queen Anne in 1709; the Shamrock by George III., in 1801; and since his present Majesty came to the throne, the Tudor Crown has been reverted to, the St. Edward's Crown having been adopted during the reigns of the Stuarts and the Georges. The motto "Dieu et mon Droit" also came in under the Stuarts. The work is completed by twenty-four appendices, which contain a good deal of additional useful information; Appendix XXIII. giving a short account of the different Foreign Body Guards from B.C. 27 to the present time. It also has a large number of excellent illustrations, including portraits of the Captains, an office which it is worthy of note, has been held by some of the greatest men in English history. Sir Reginald Hennell is certainly to be heartily congratulated on the infinite pains he has taken over his arduous task, and the success which has attended his efforts.

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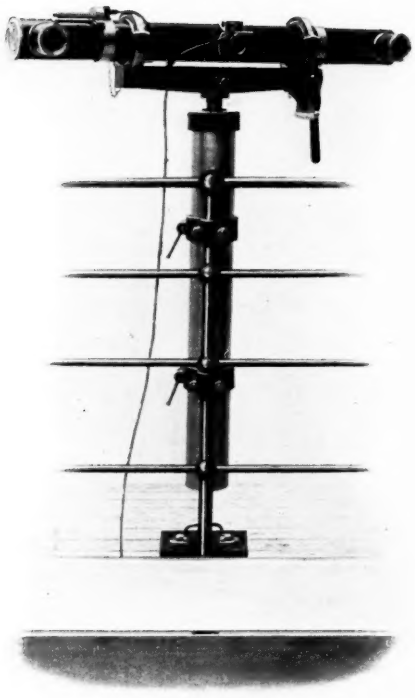

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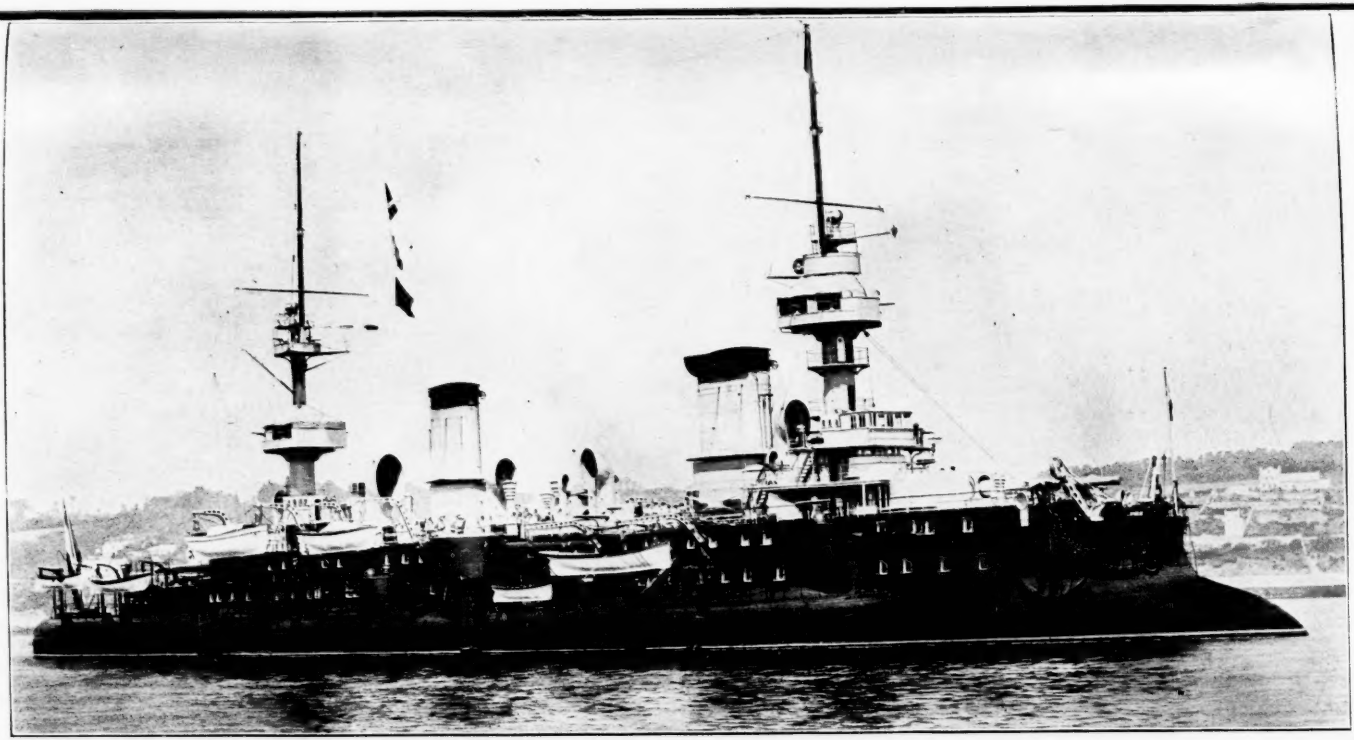

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